



US009776544B2

(12) **United States Patent**
Neterer

(10) **Patent No.:** **US 9,776,544 B2**
(45) **Date of Patent:** **Oct. 3, 2017**

(54) **STOWABLE SEAT**

B60N 2/3011; B60N 2/682; B60N 2/30;
B60N 2/24; B60N 2/242; B60N
2002/684; B60N 2/304; B60N 2/3045;
B60N 2/3061

(71) Applicant: **NORCO INDUSTRIES, INC.**,
Compton, CA (US)

(72) Inventor: **Alan Neterer**, Elkhart, IN (US)

USPC 297/378.1, 354.1, 353, 14
See application file for complete search history.

(73) Assignee: **NORCO INDUSTRIES, INC.**,
Compton, CA (US)

(56) **References Cited**

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

U.S. PATENT DOCUMENTS

(21) Appl. No.: **14/717,499**

(22) Filed: **May 20, 2015**

(65) **Prior Publication Data**

US 2015/0343923 A1 Dec. 3, 2015

3,774,964 A	11/1973	Turner
3,926,396 A	12/1975	Hall et al.
4,040,660 A	8/1977	Barecki
4,085,963 A	4/1978	Bullerdieck
4,120,531 A	10/1978	Fefferman
4,123,811 A	11/1978	Aldana
4,218,091 A	8/1980	Webster
4,431,233 A	2/1984	Ernst
4,530,541 A	7/1985	Resag et al.
4,579,386 A	4/1986	Rupp et al.

(Continued)

Related U.S. Application Data

FOREIGN PATENT DOCUMENTS

(60) Provisional application No. 62/000,777, filed on May
20, 2014.

DE	1901045 A1	8/1969
DE	1480466 A1	9/1969
DE	2360627 A1	6/1974

(51) **Int. Cl.**

B60N 2/02	(2006.01)
B60N 2/48	(2006.01)
B60N 2/68	(2006.01)
B60N 2/235	(2006.01)
B60N 2/30	(2006.01)
B60N 2/24	(2006.01)

Primary Examiner — Chi Q Nguyen

(74) *Attorney, Agent, or Firm* — Vorys, Sater, Seymour
and Pease LLP

(52) **U.S. Cl.**

CPC **B60N 2/68** (2013.01); **B60N 2/2356**
(2013.01); **B60N 2/3011** (2013.01); **B60N**
2/3043 (2013.01); **B60N 2/24** (2013.01); **B60N**
2/242 (2013.01); **B60N 2/30** (2013.01); **B60N**
2/304 (2013.01); **B60N 2/3045** (2013.01);
B60N 2/3061 (2013.01); **B60N 2/682**
(2013.01); **B60N 2002/684** (2013.01)

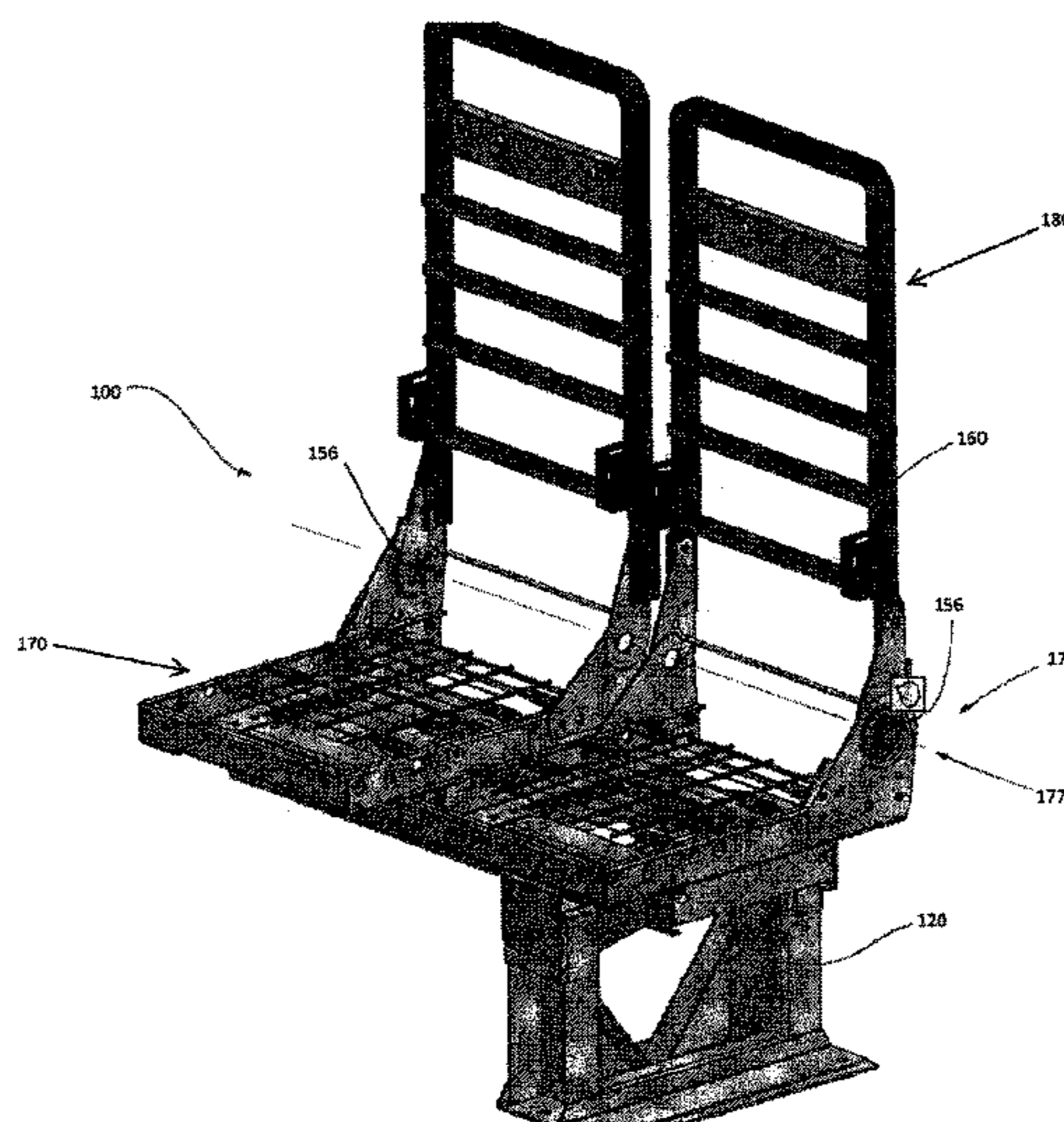
(57) **ABSTRACT**

A stowable seat system includes a seat base and a seat frame
operationally engaged with the seat base. The seat base
includes a vehicle engagement portion adapted for opera-
tional engagement with an associated vehicle, and a seat
engagement portion movably engaged with the vehicle
engagement portion at a first actuation region. The seat
frame includes a bottom portion, and a back portion mov-
ably engaged with the bottom portion at a second actuation
region.

(58) **Field of Classification Search**

CPC B60N 2/68; B60N 2/3043; B60N 2/2356;

16 Claims, 23 Drawing Sheets



(56)

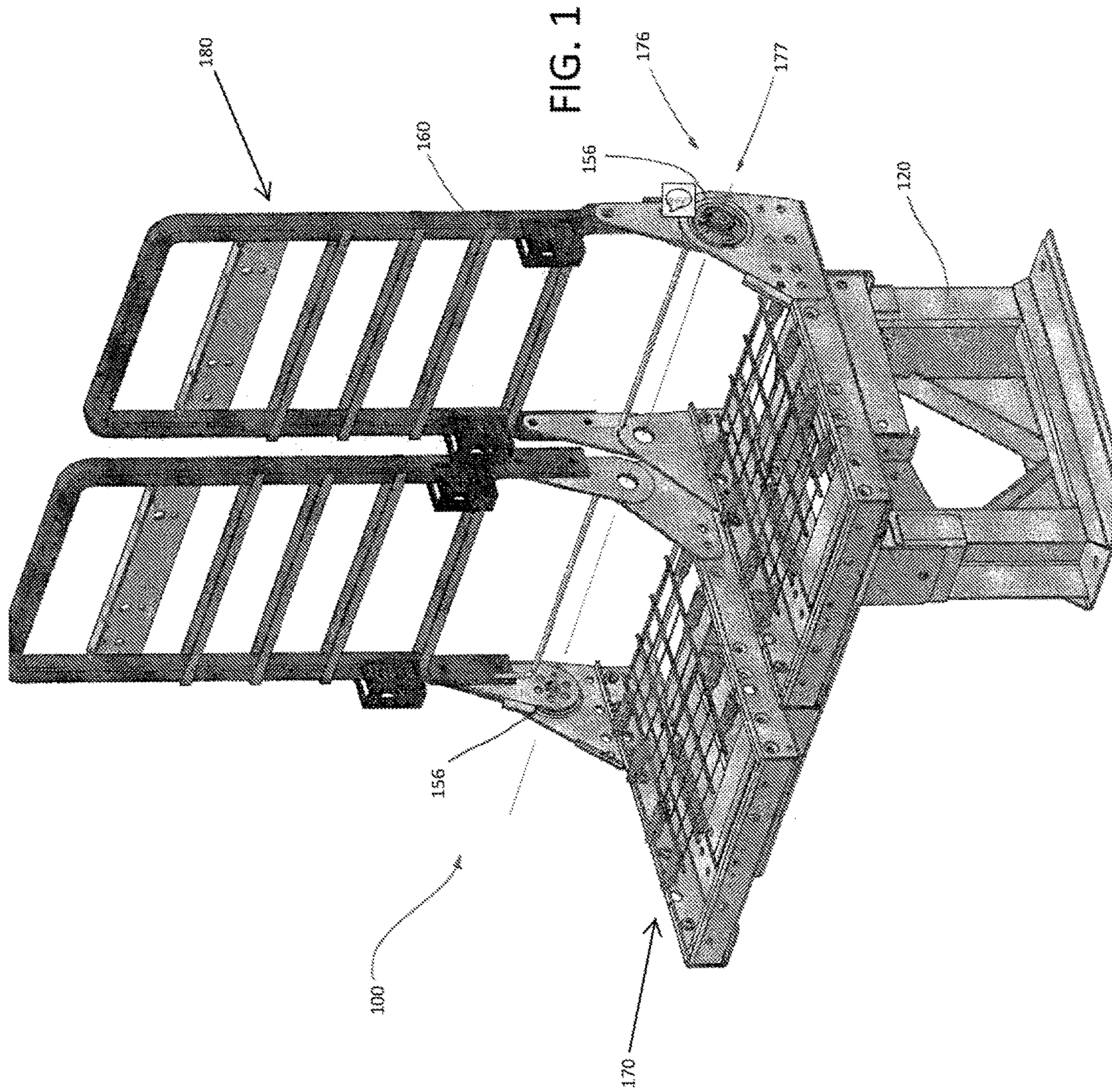
References Cited

U.S. PATENT DOCUMENTS

4,589,301 A 5/1986 Griner
 4,595,238 A 6/1986 Göldner
 4,805,952 A 2/1989 Coleman
 4,957,321 A * 9/1990 Martin B60N 2/045
 296/65.09
 4,971,379 A 11/1990 Rumpel et al.
 5,310,247 A 5/1994 Fujimori et al.
 5,318,341 A 6/1994 Griswold et al.
 5,501,509 A 3/1996 Urrutia
 5,597,205 A 1/1997 Glance
 5,697,670 A 12/1997 Husted et al.
 5,711,577 A 1/1998 Whalen
 5,730,106 A 3/1998 Gonzalez
 5,909,926 A 6/1999 Gonzalez
 6,056,366 A 5/2000 Haynes et al.
 6,106,066 A * 8/2000 Moffa B60N 2/3011
 297/326

8,056,954 B2 * 11/2011 Homier B60N 2/3013
 296/65.01
 2005/0269842 A1 * 12/2005 Braun B60N 2/242
 297/14
 2007/0052255 A1 * 3/2007 O'Connor B60N 2/01583
 296/65.03
 2007/0096496 A1 * 5/2007 Saberan B60N 2/045
 296/65.09
 2008/0203772 A1 * 8/2008 Holdampf B60N 2/3011
 297/15
 2012/0153658 A1 * 6/2012 Kanda B60N 2/1615
 296/65.13
 2013/0341953 A1 * 12/2013 White B60N 2/065
 296/65.01
 2015/0069808 A1 * 3/2015 White B60N 2/4855
 297/354.12
 2015/0203011 A1 * 7/2015 Fujita B60N 2/68
 297/284.11
 2016/0001677 A1 * 1/2016 Stewart B60N 2/22
 297/361.1

* cited by examiner



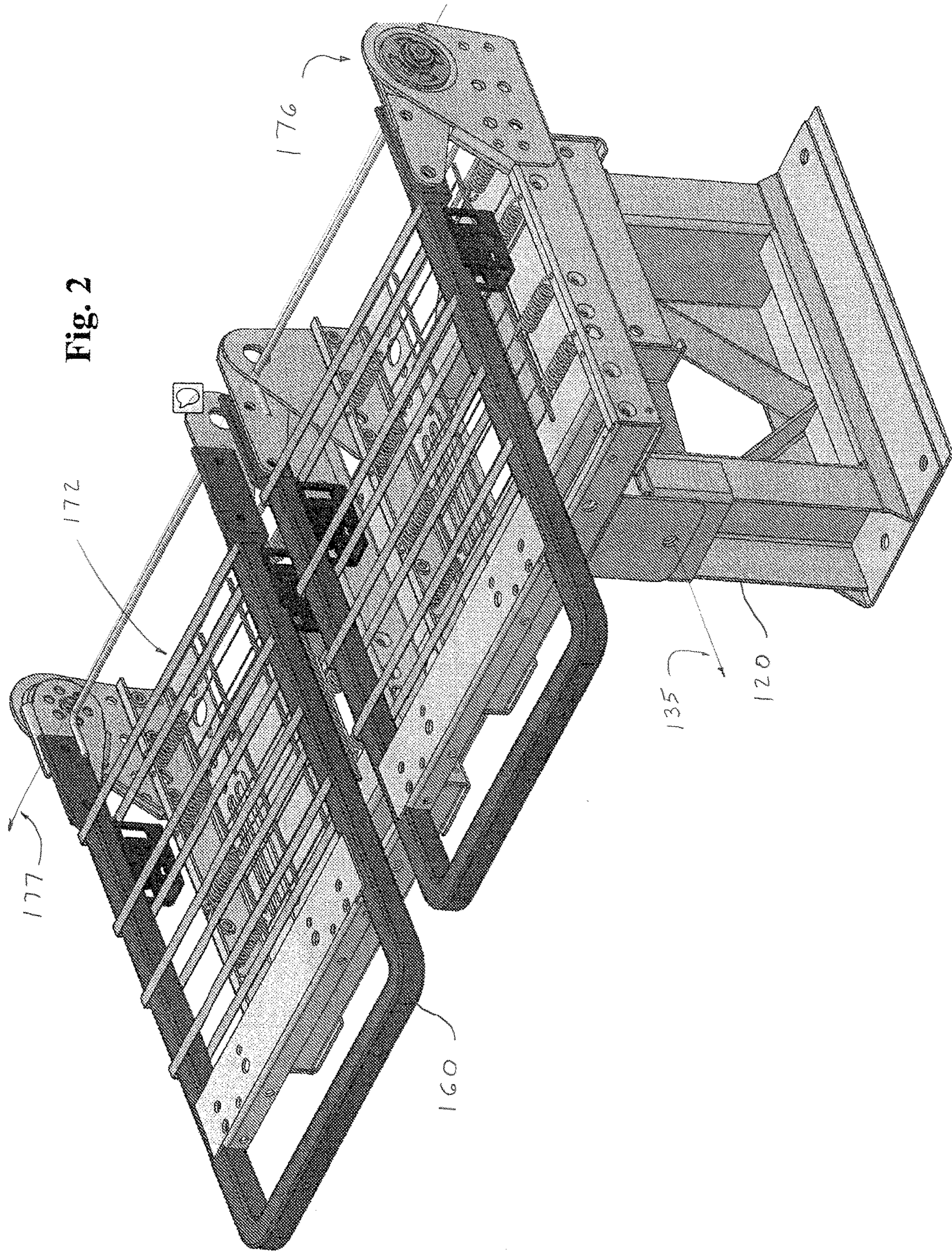
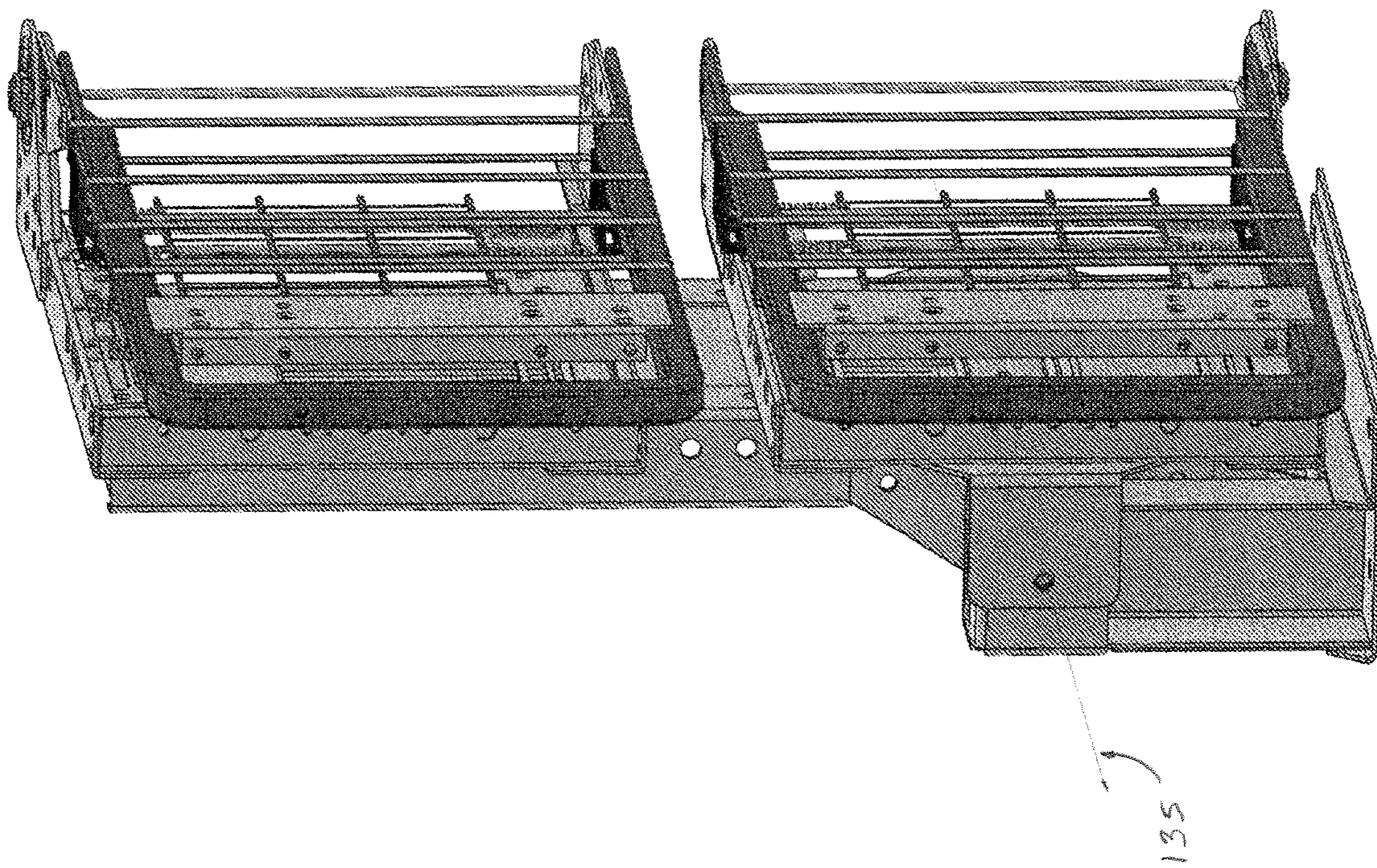


Fig. 2

Fig. 3



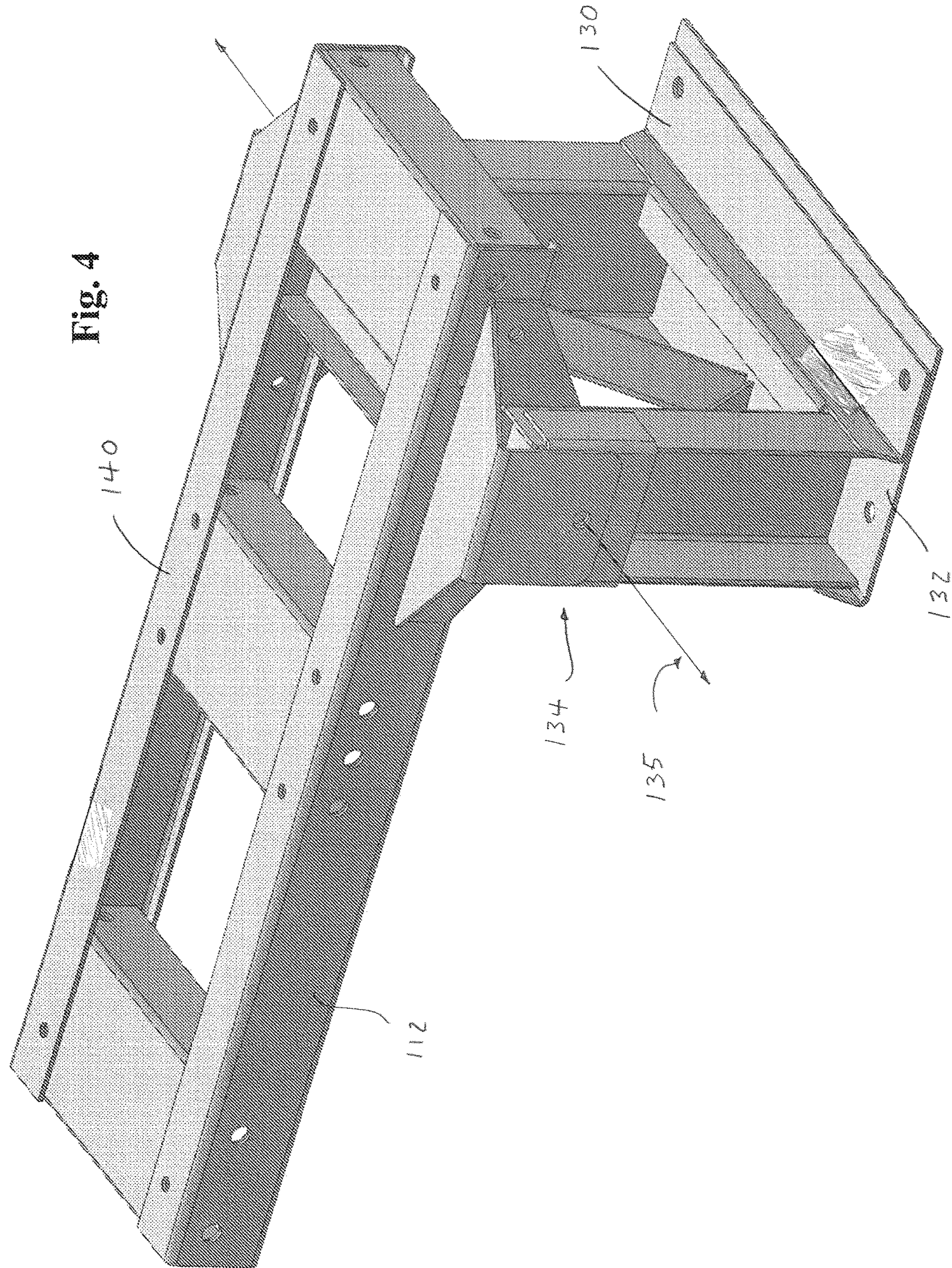


Fig. 5

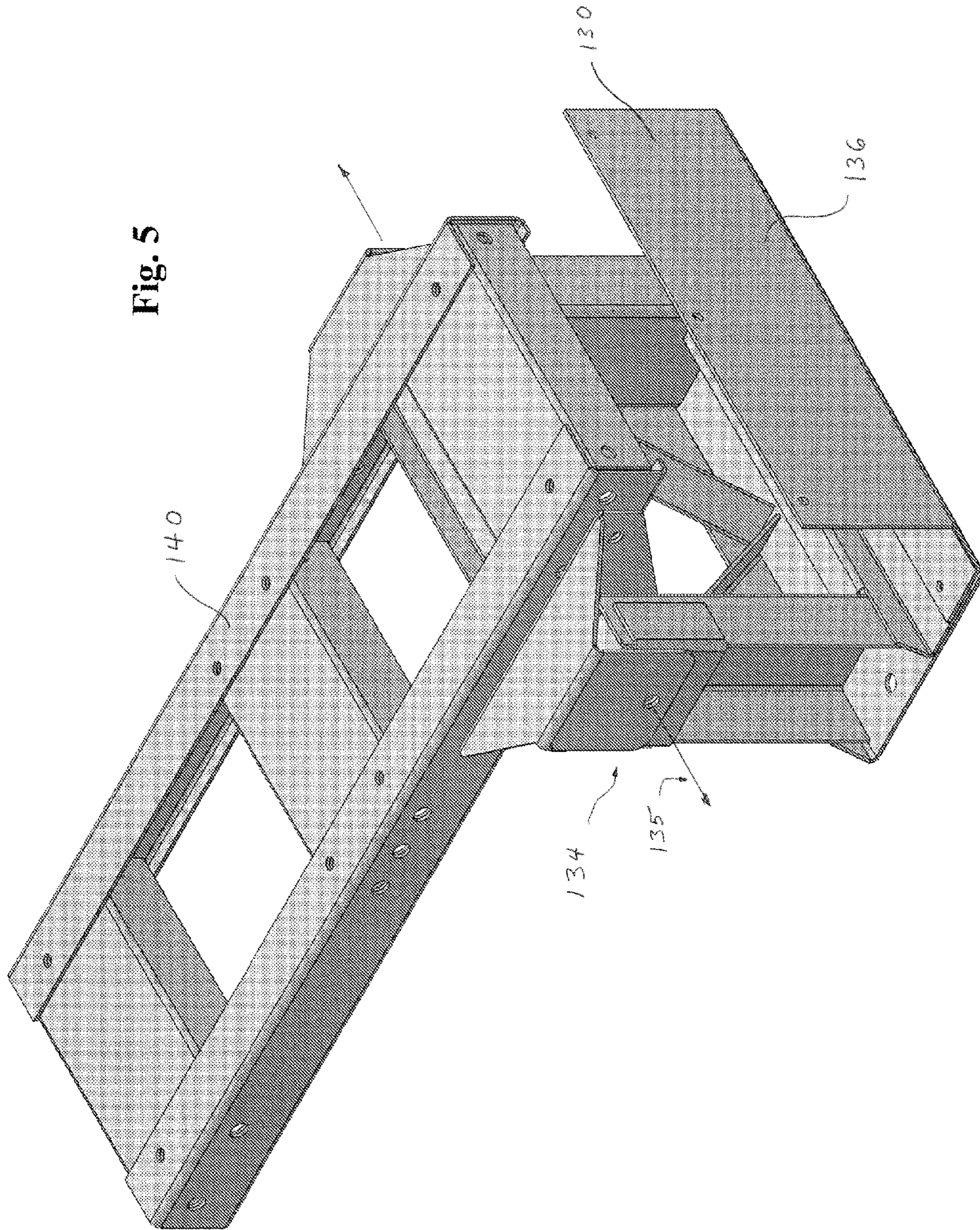


FIG. 6b

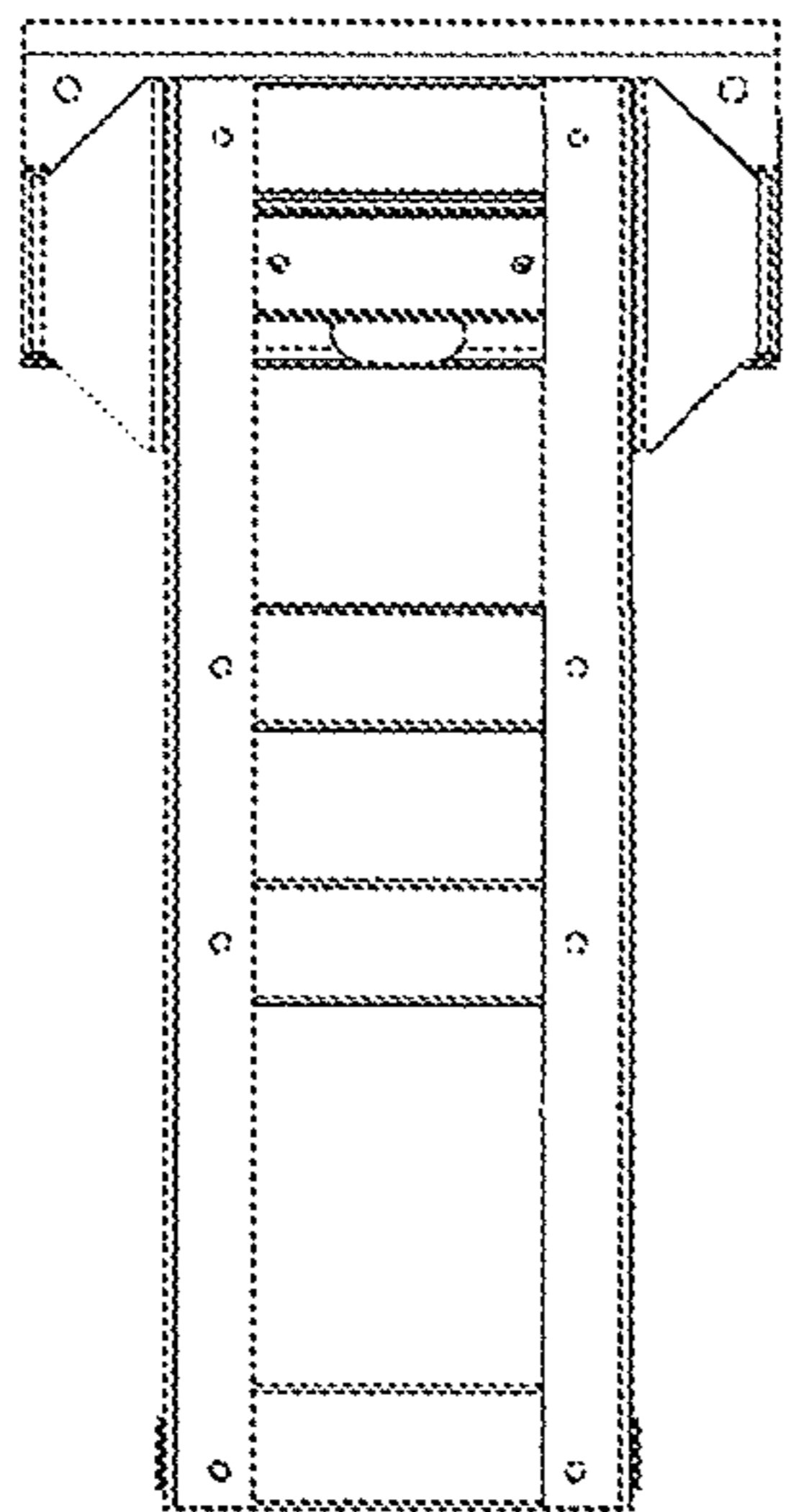


FIG. 6c

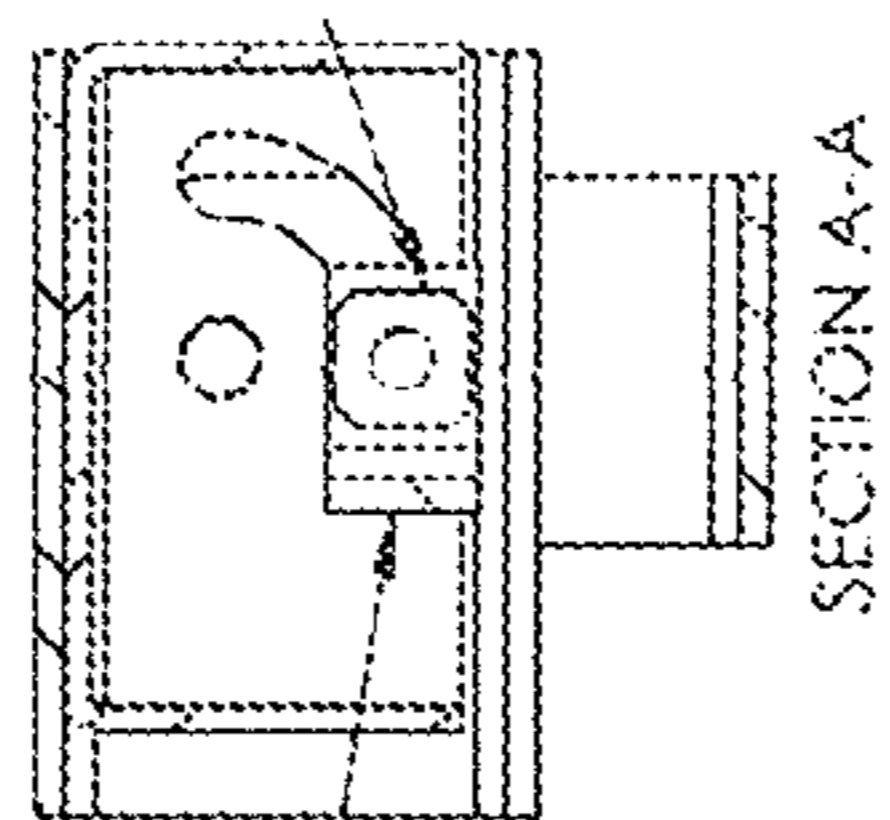


FIG. 6d

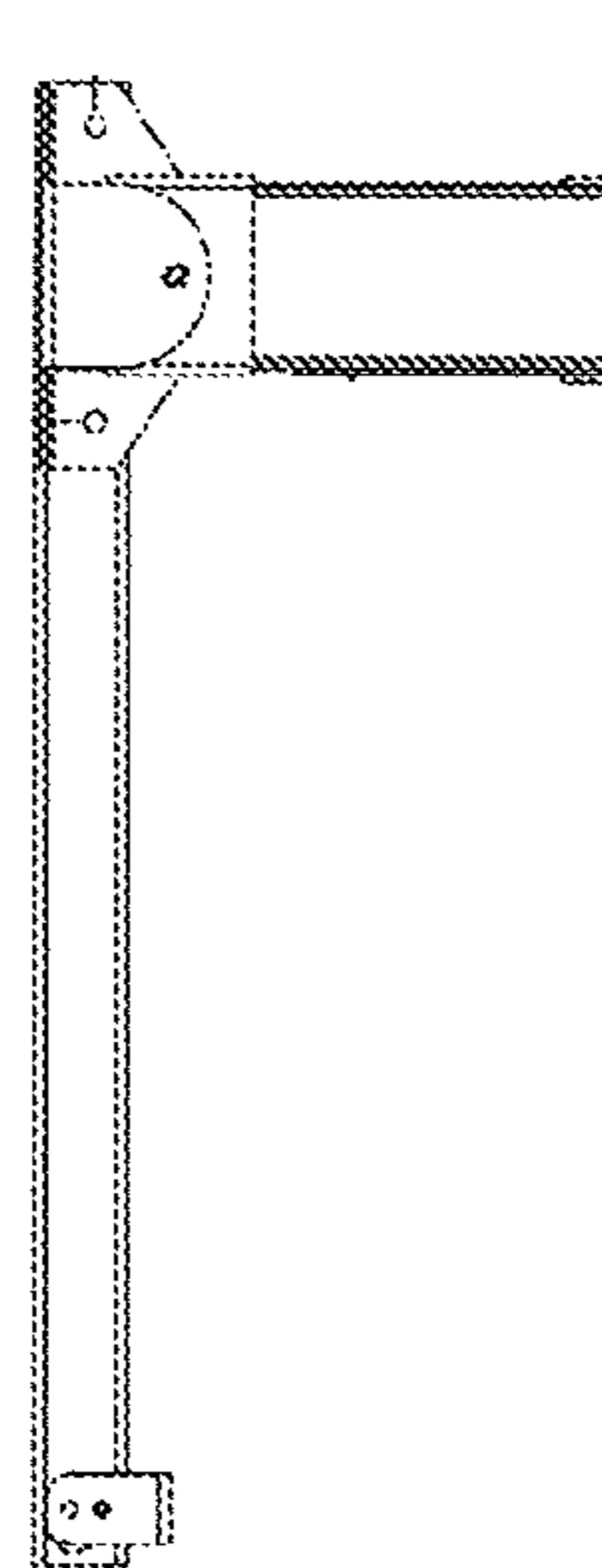


FIG. 6a

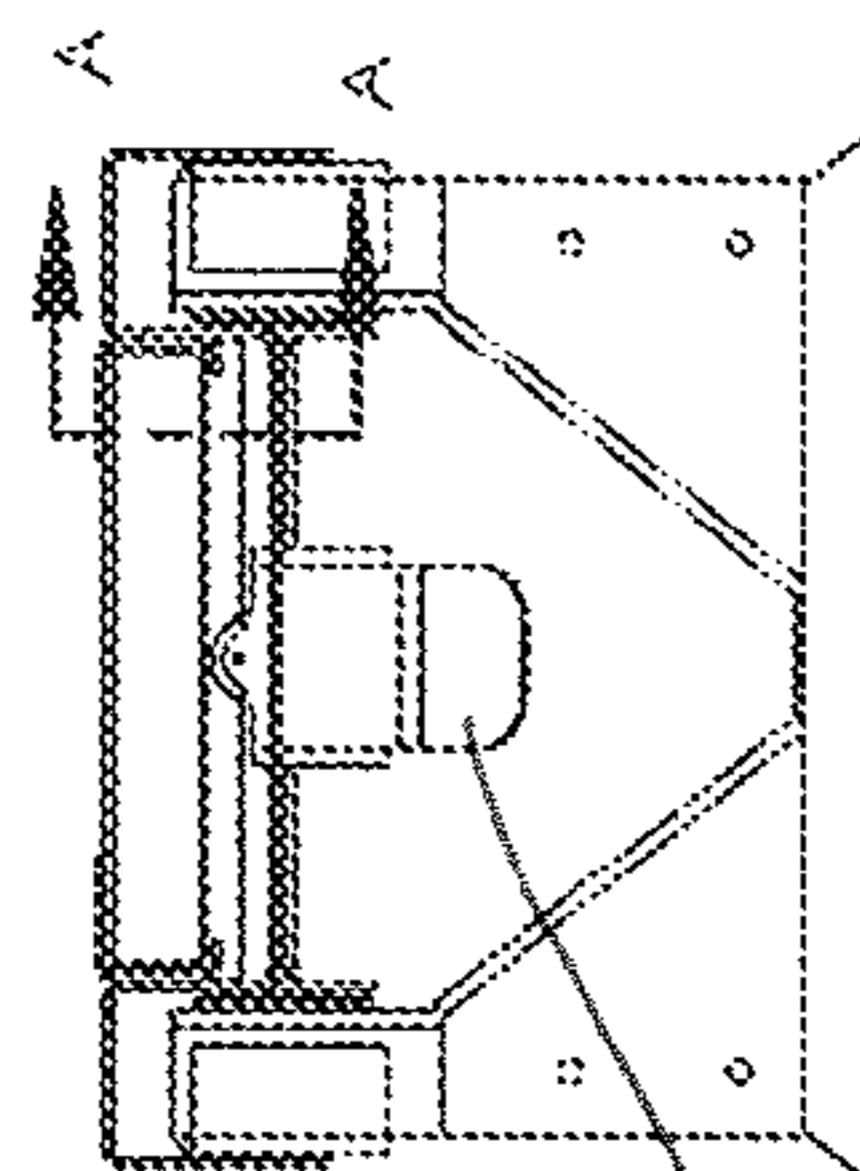
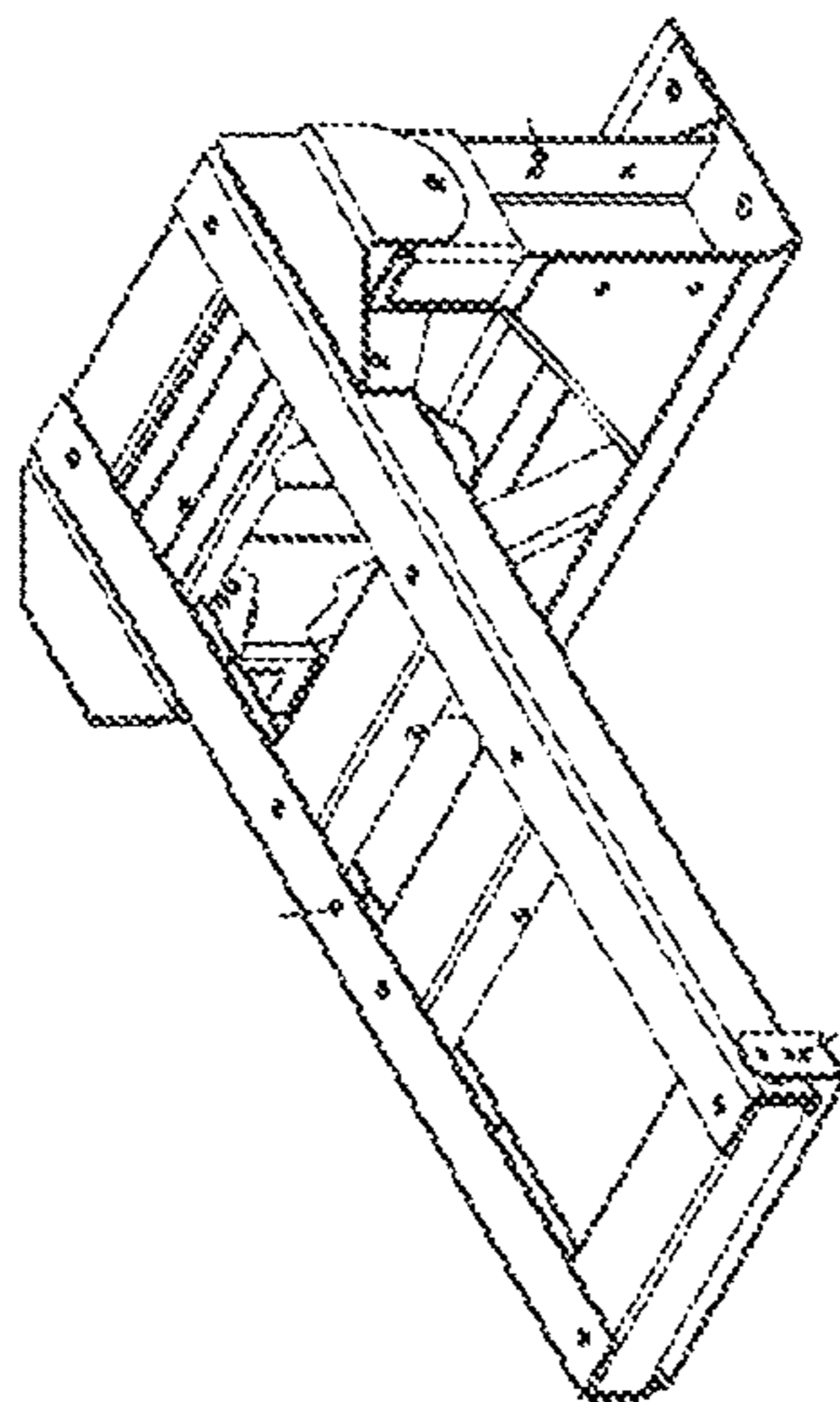


FIG. 6e

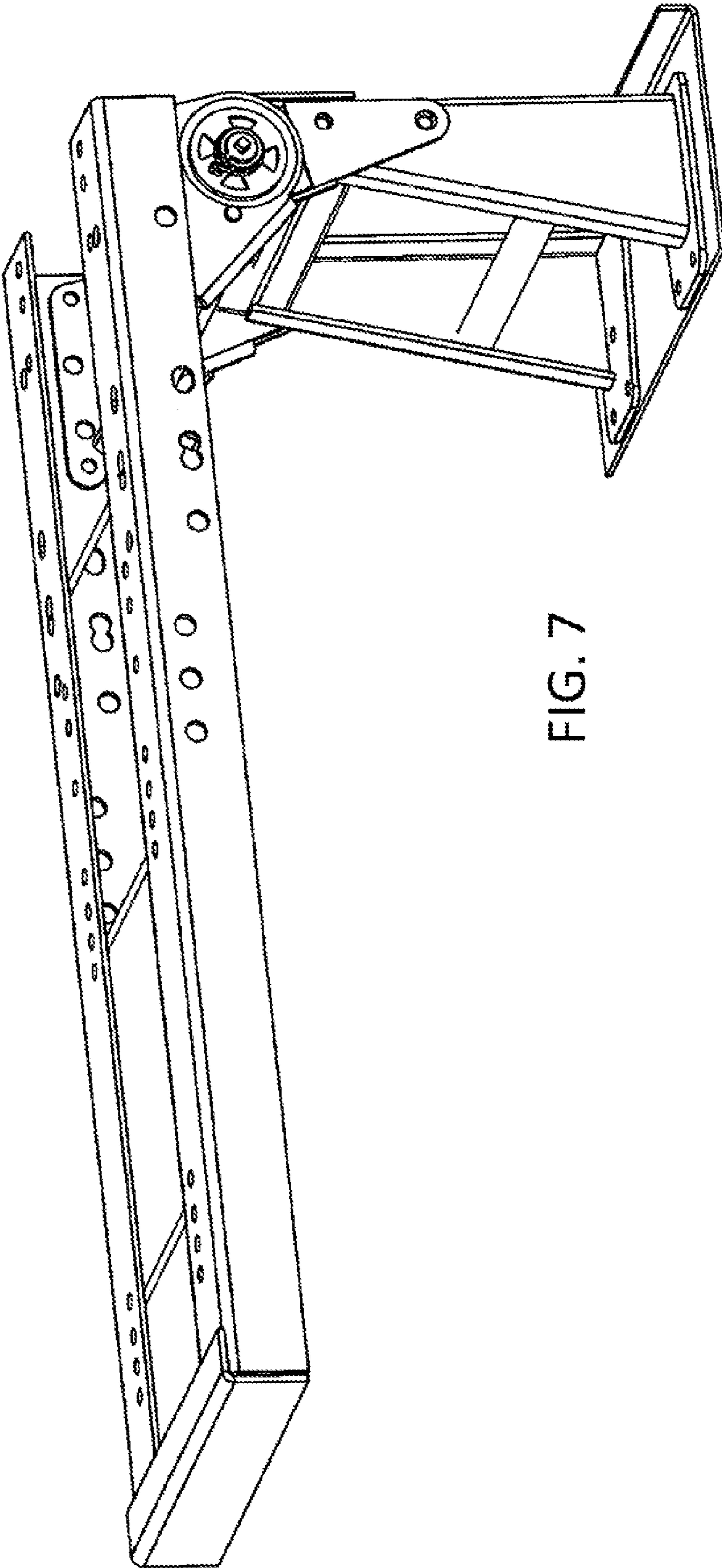


FIG. 7

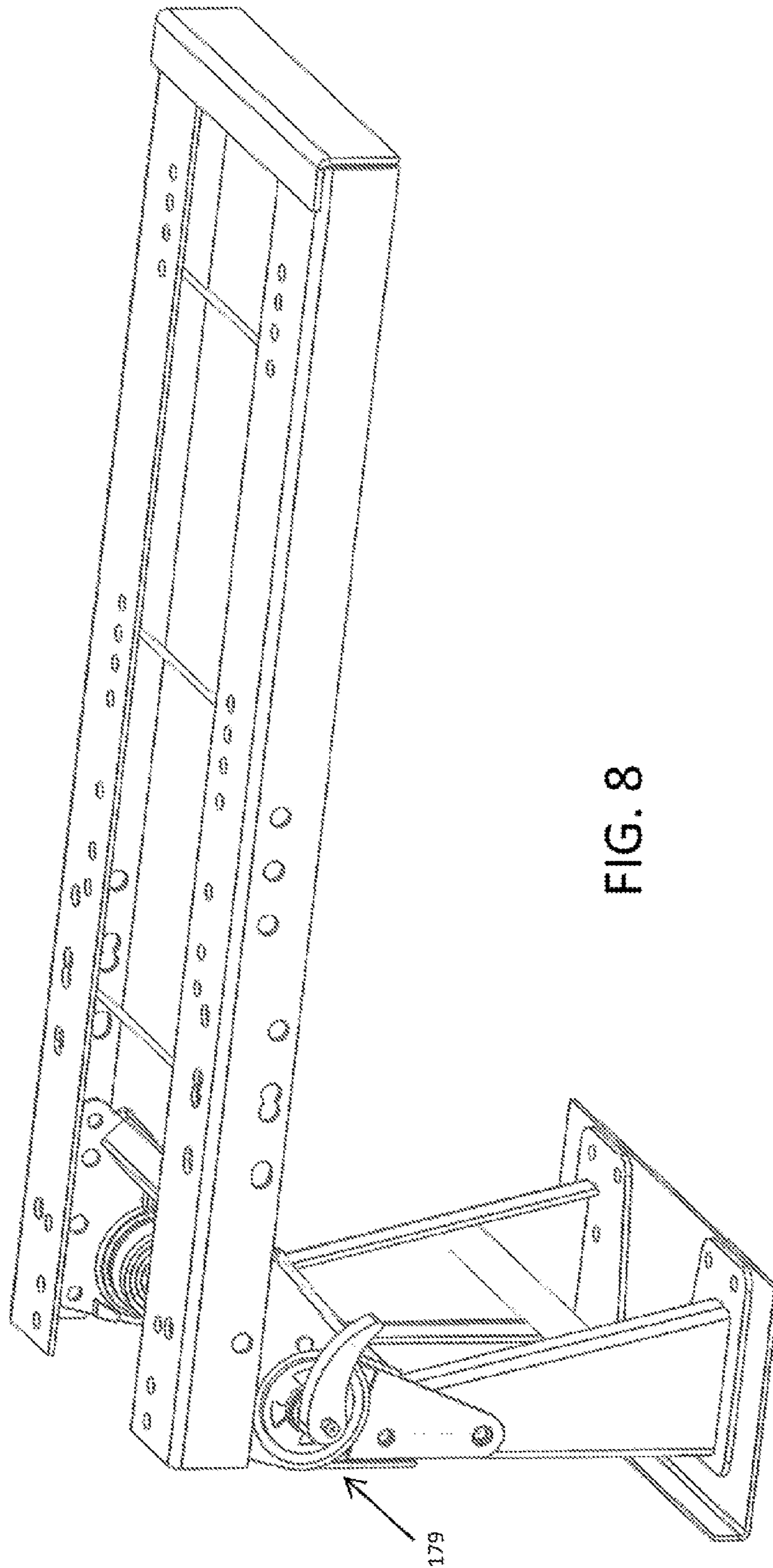


FIG. 8

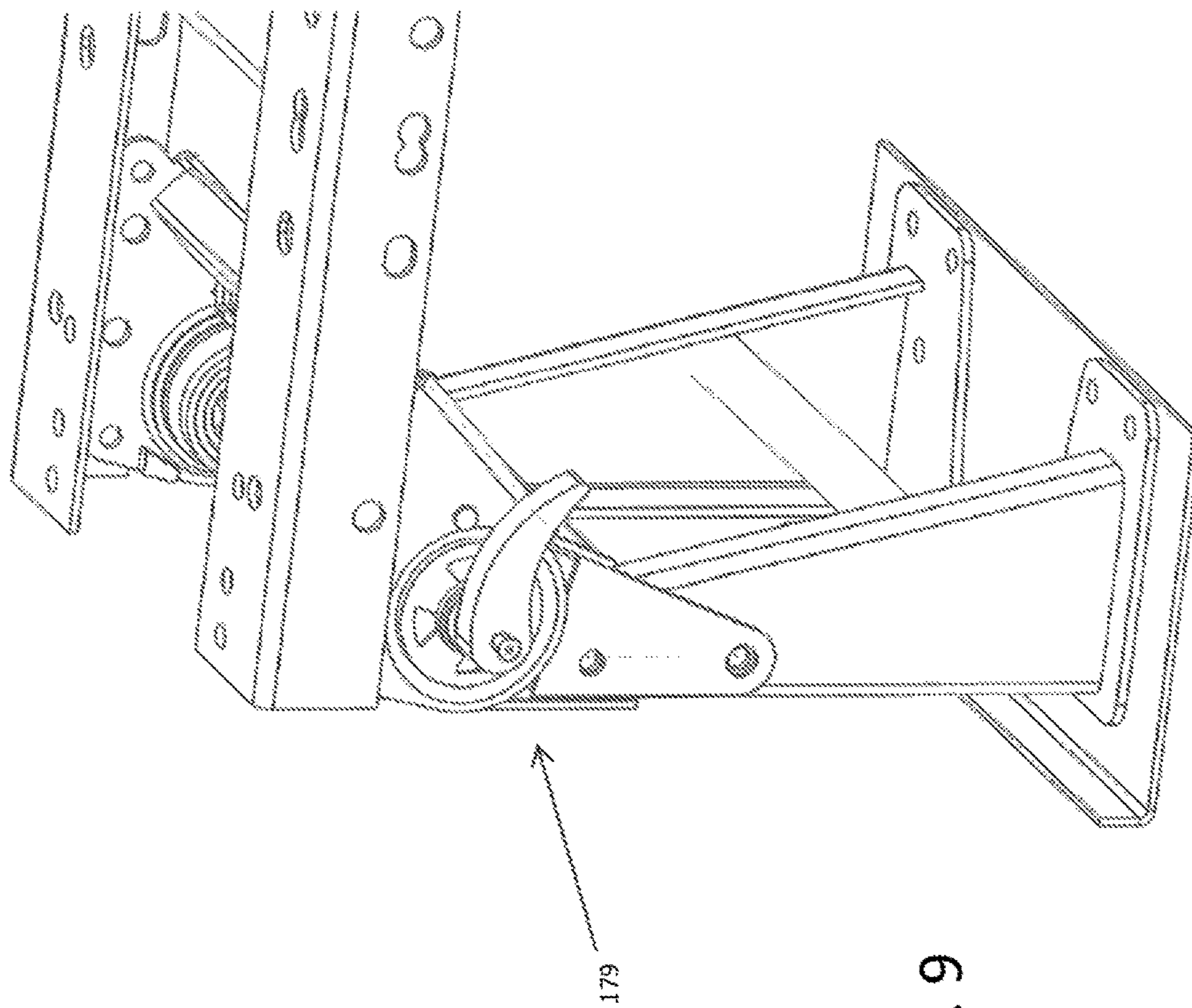
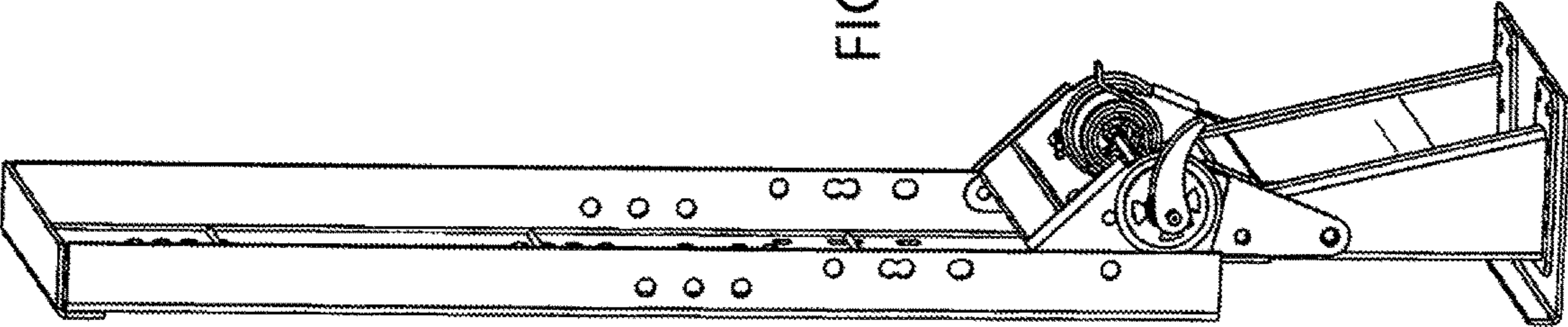


FIG. 9

FIG. 10



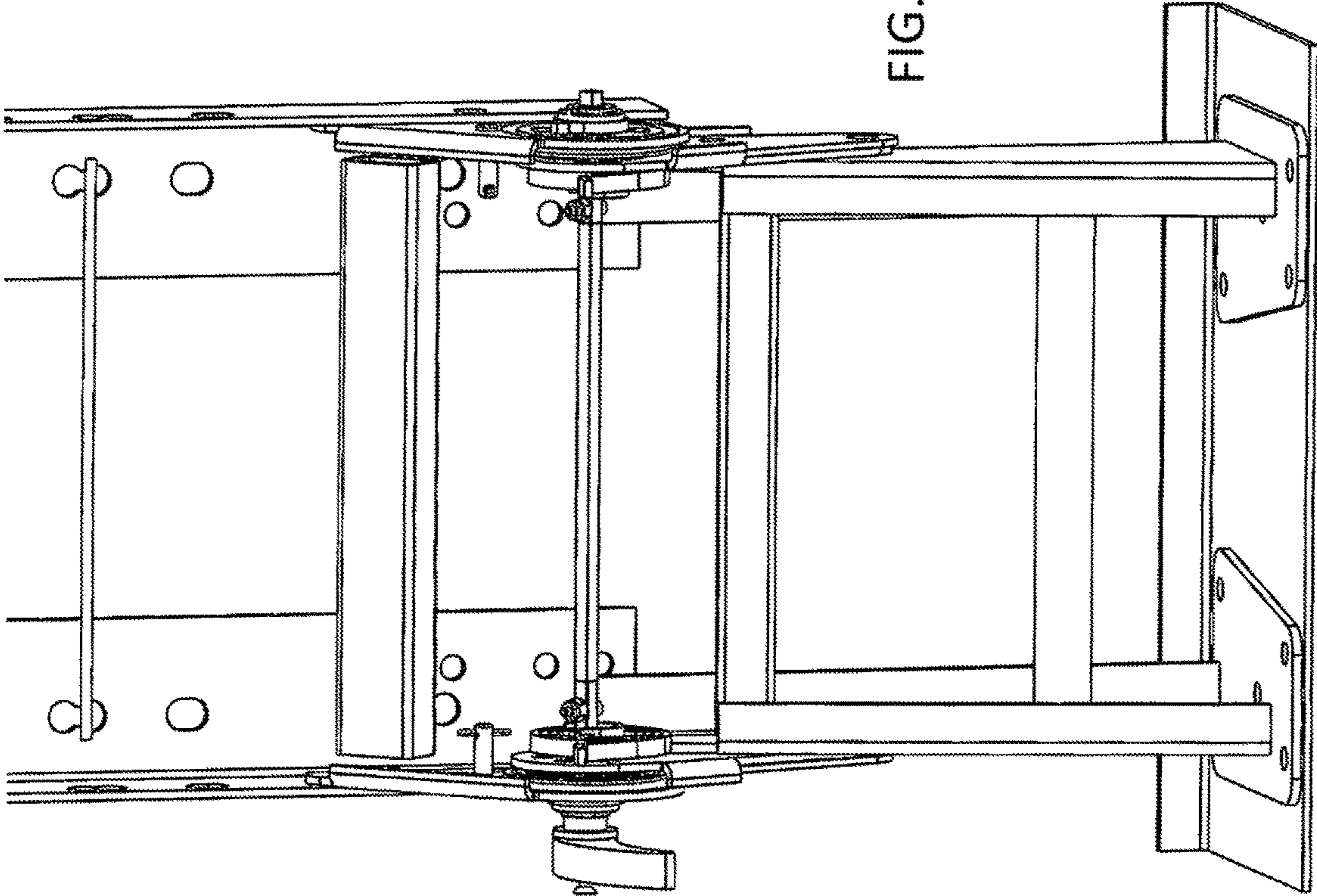


FIG. 11

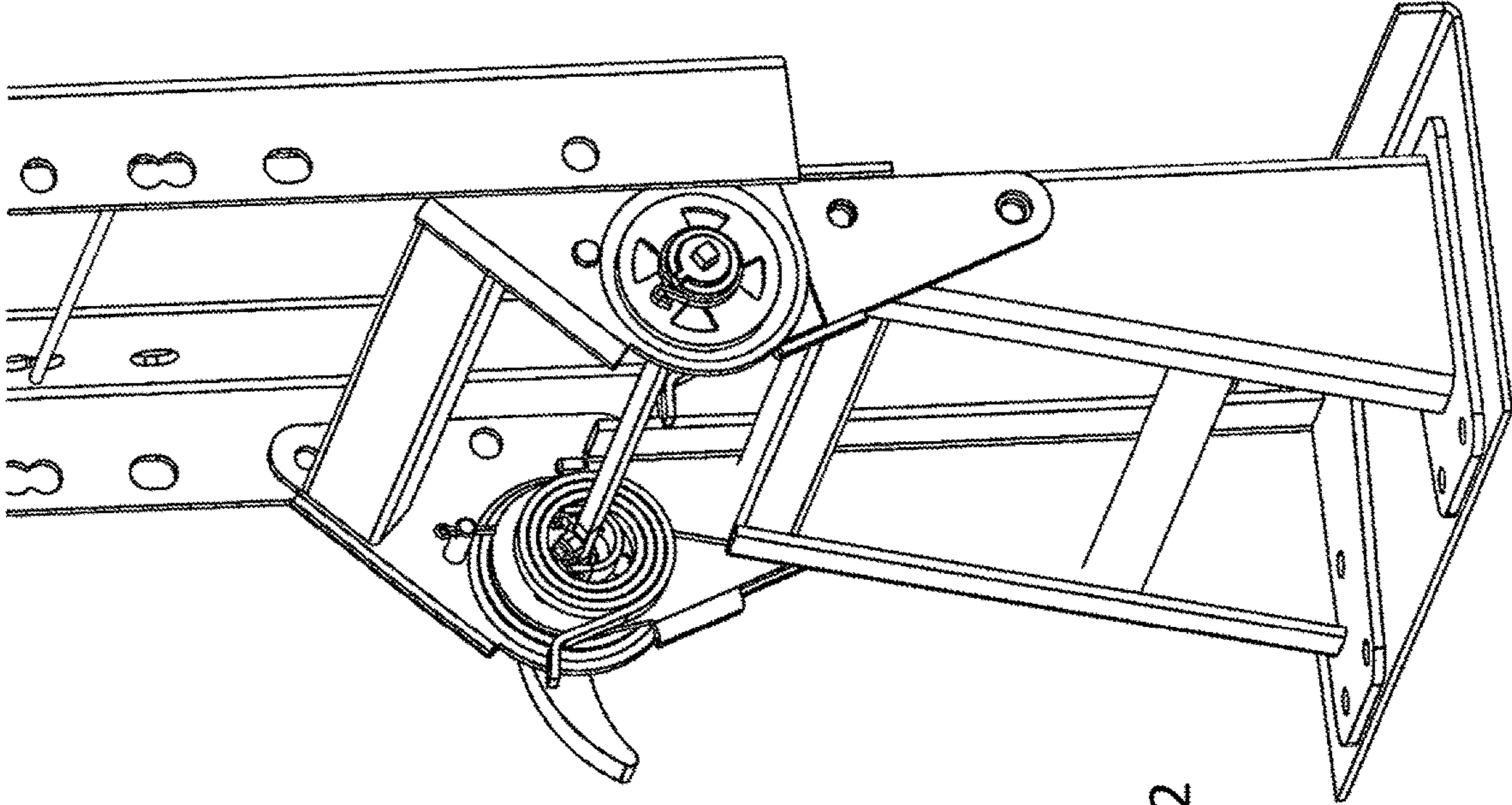


FIG. 12

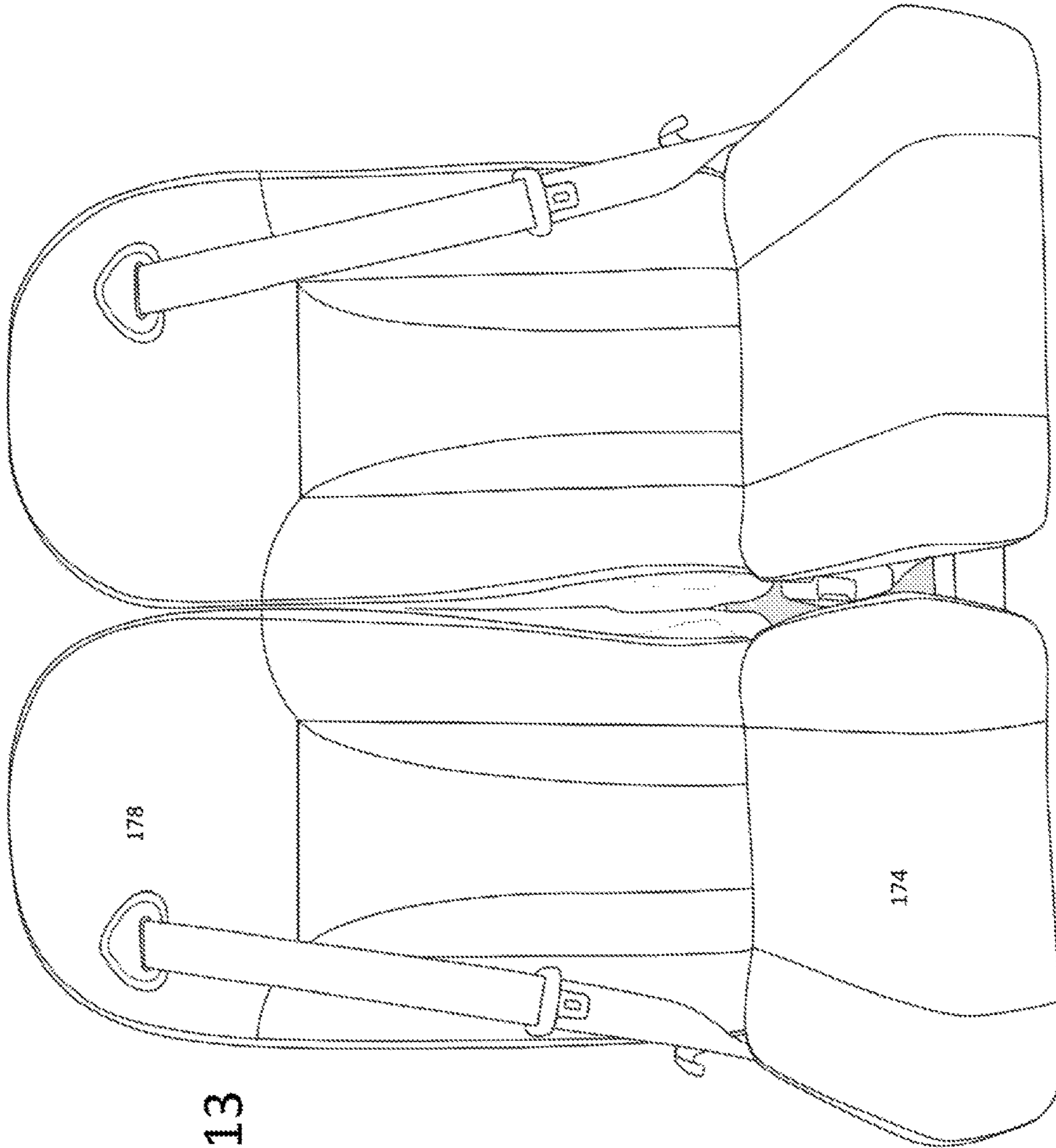


FIG. 13

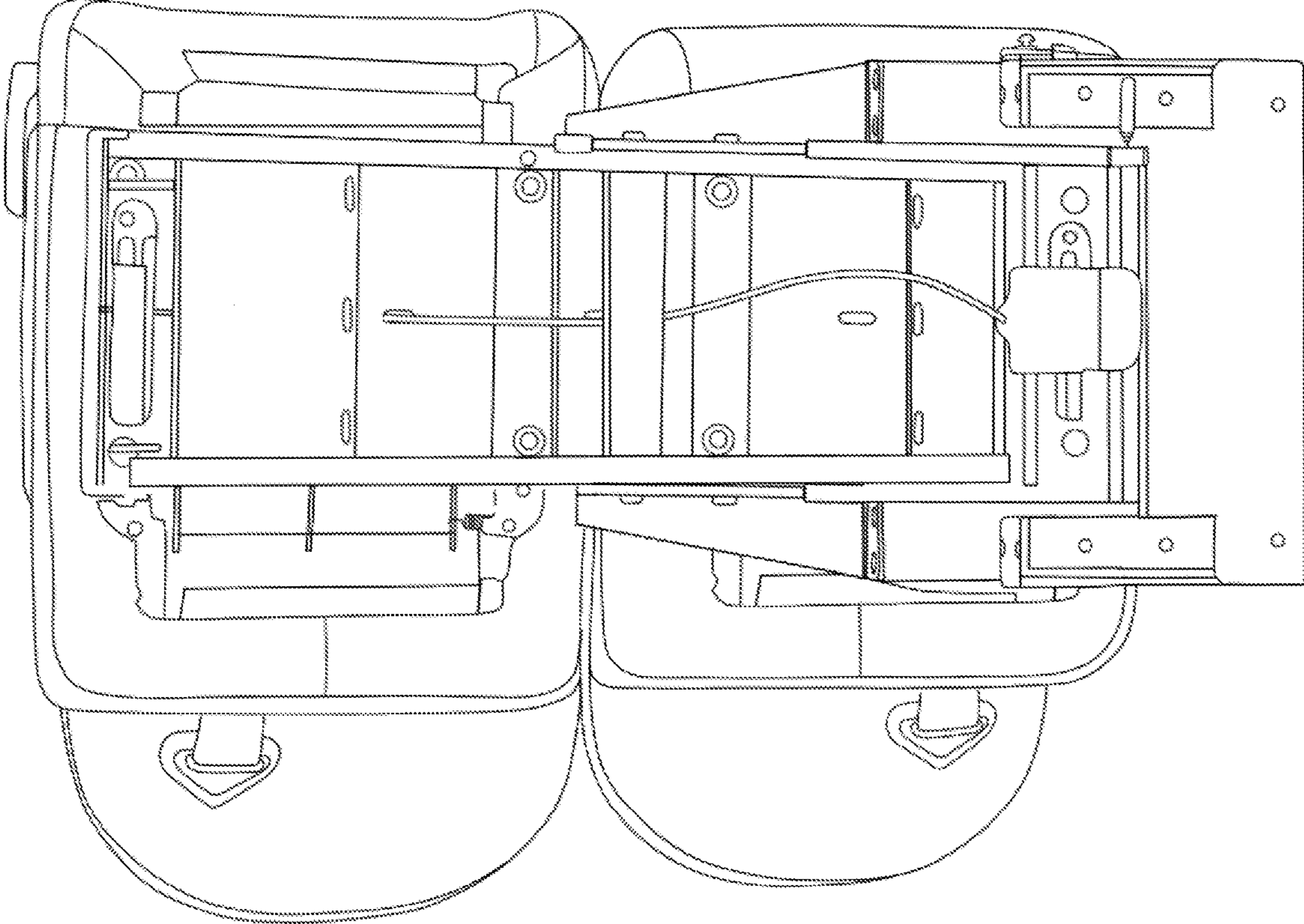


FIG. 14



FIG. 15

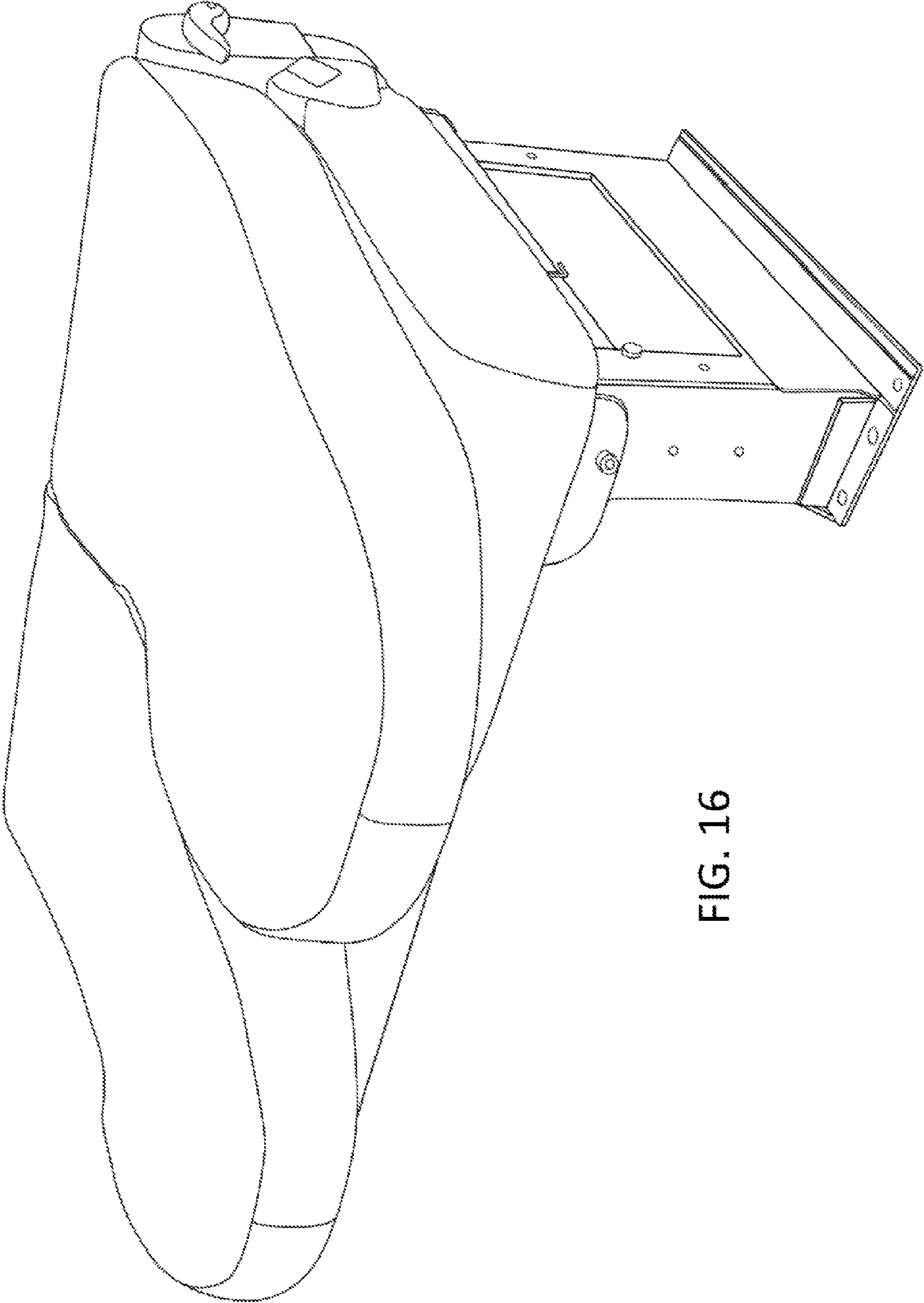
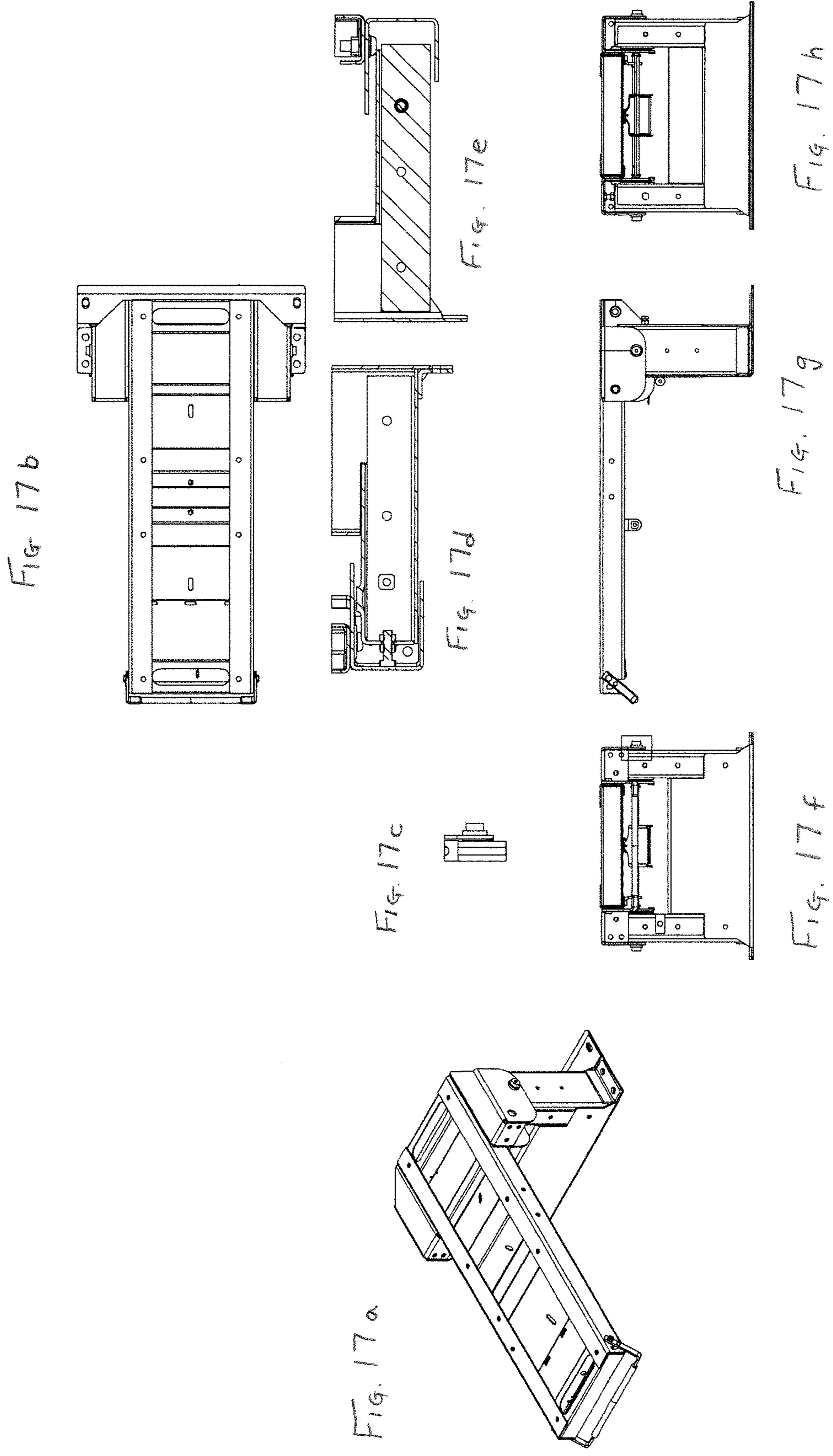


FIG. 16



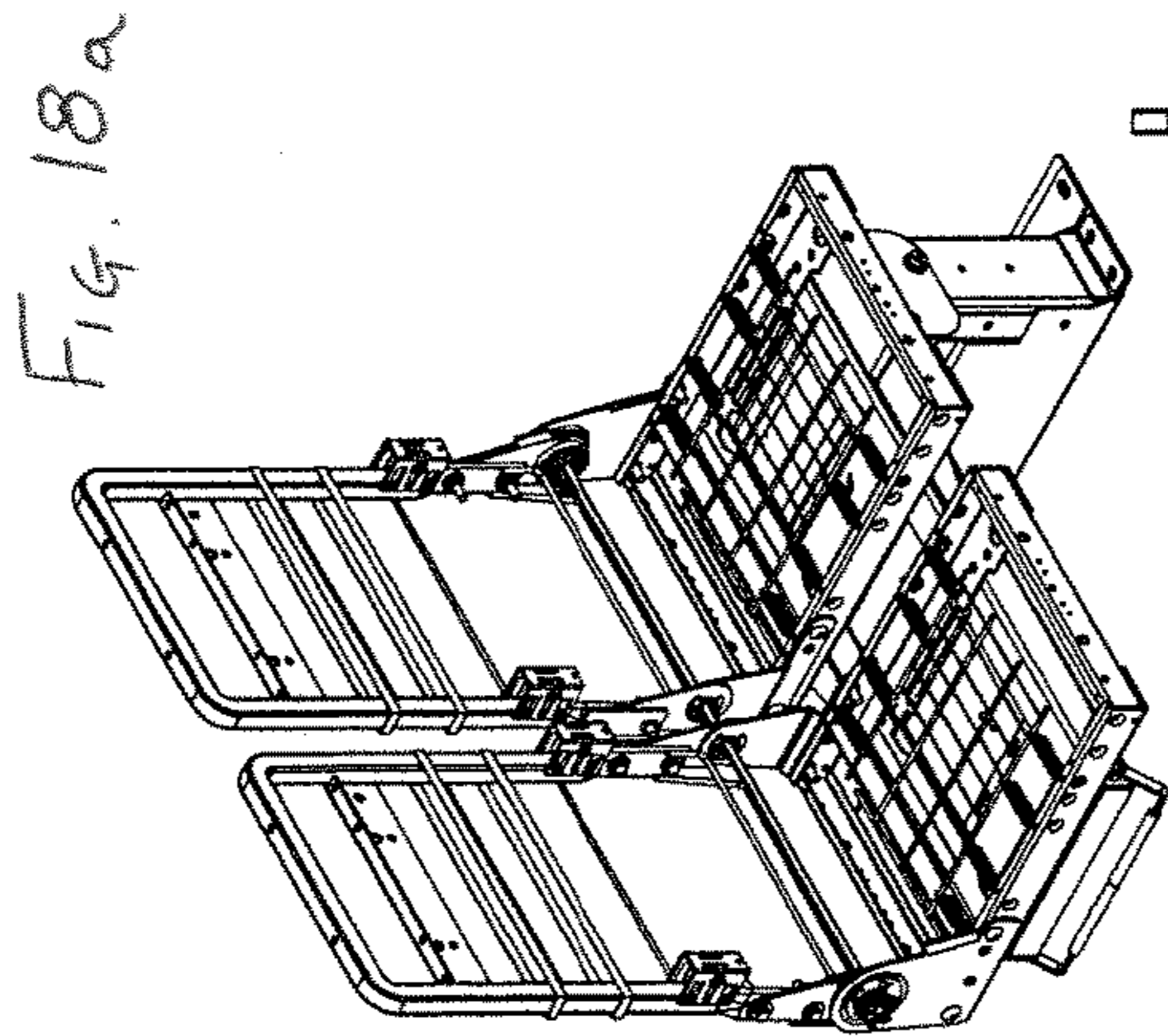


Fig. 18b

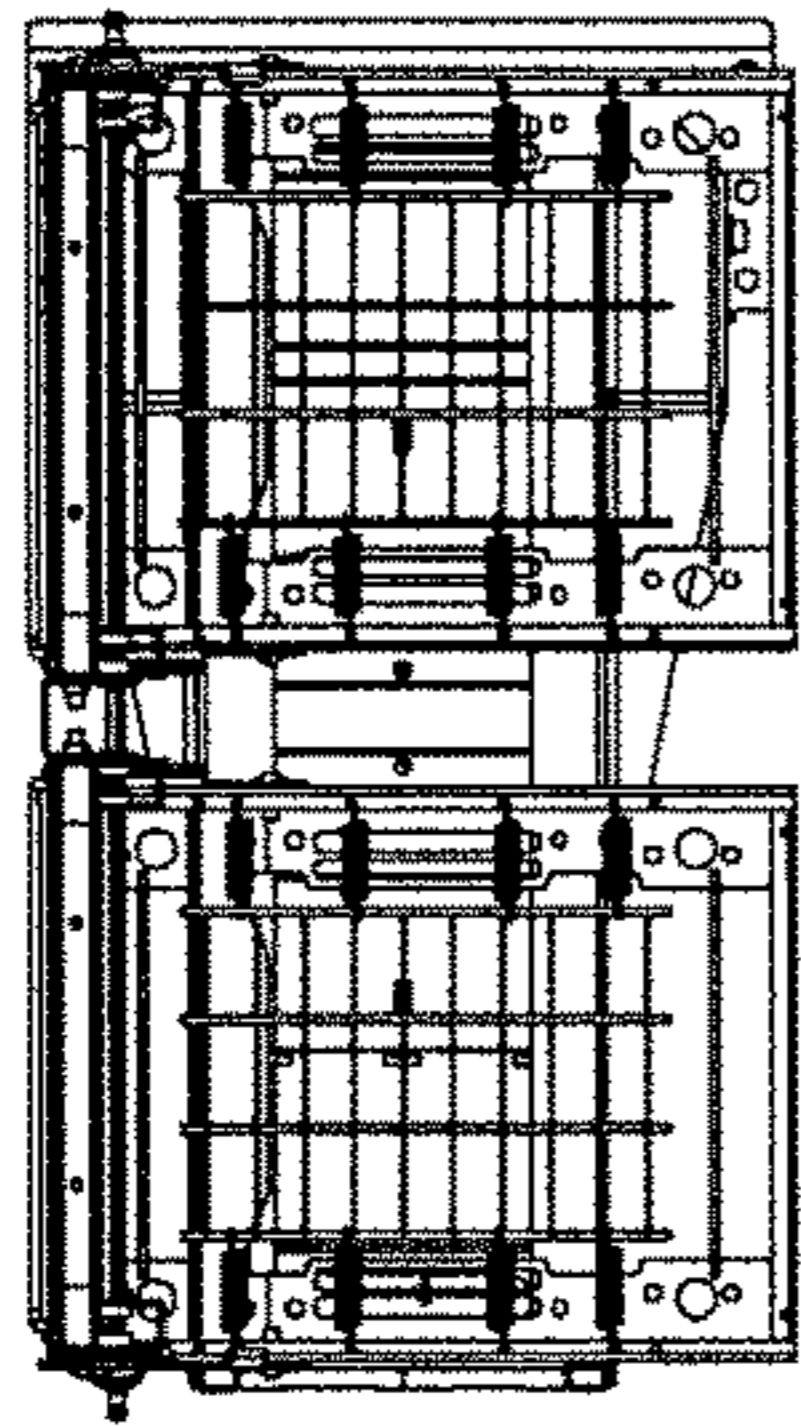


Fig. 18c

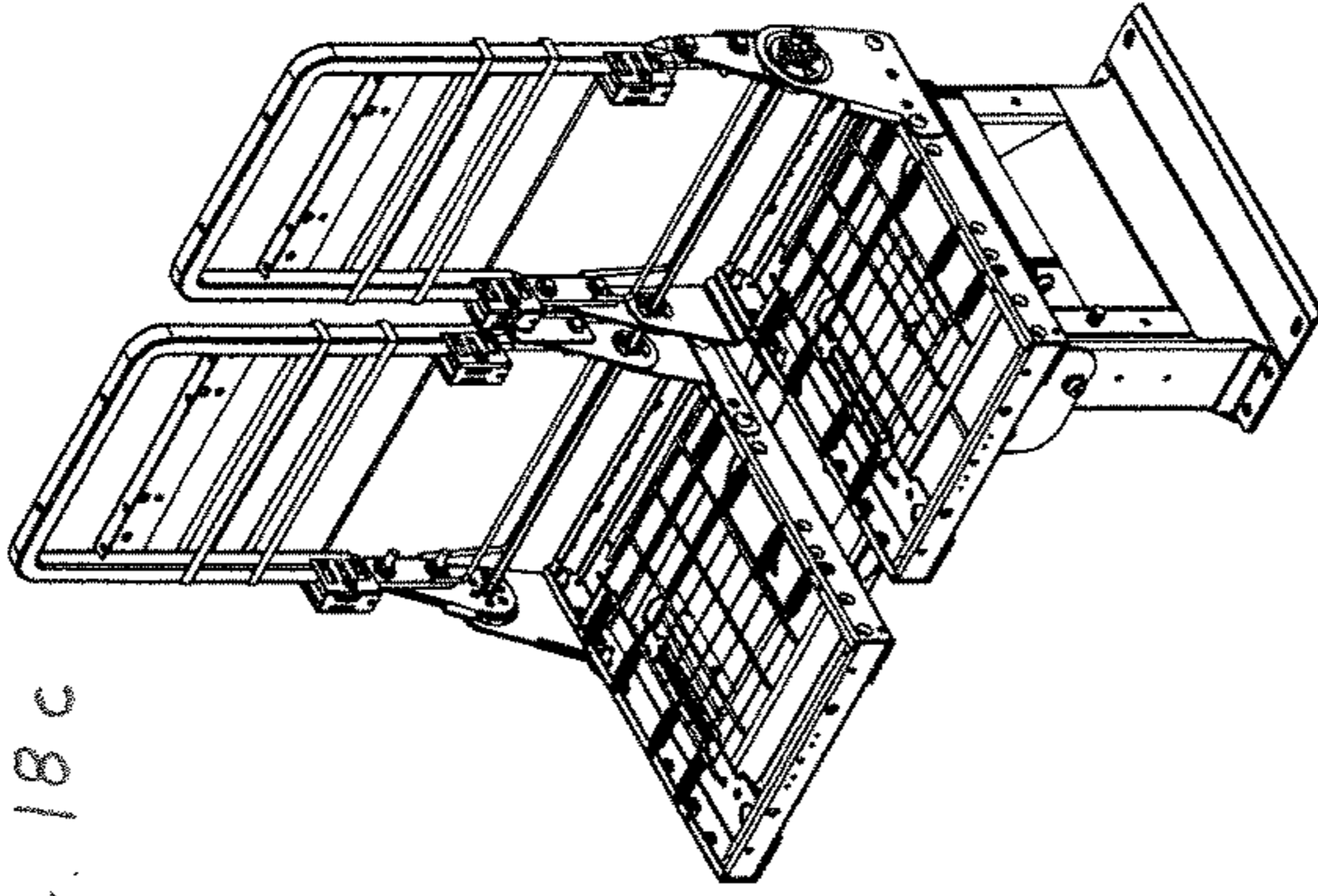


Fig. 18e

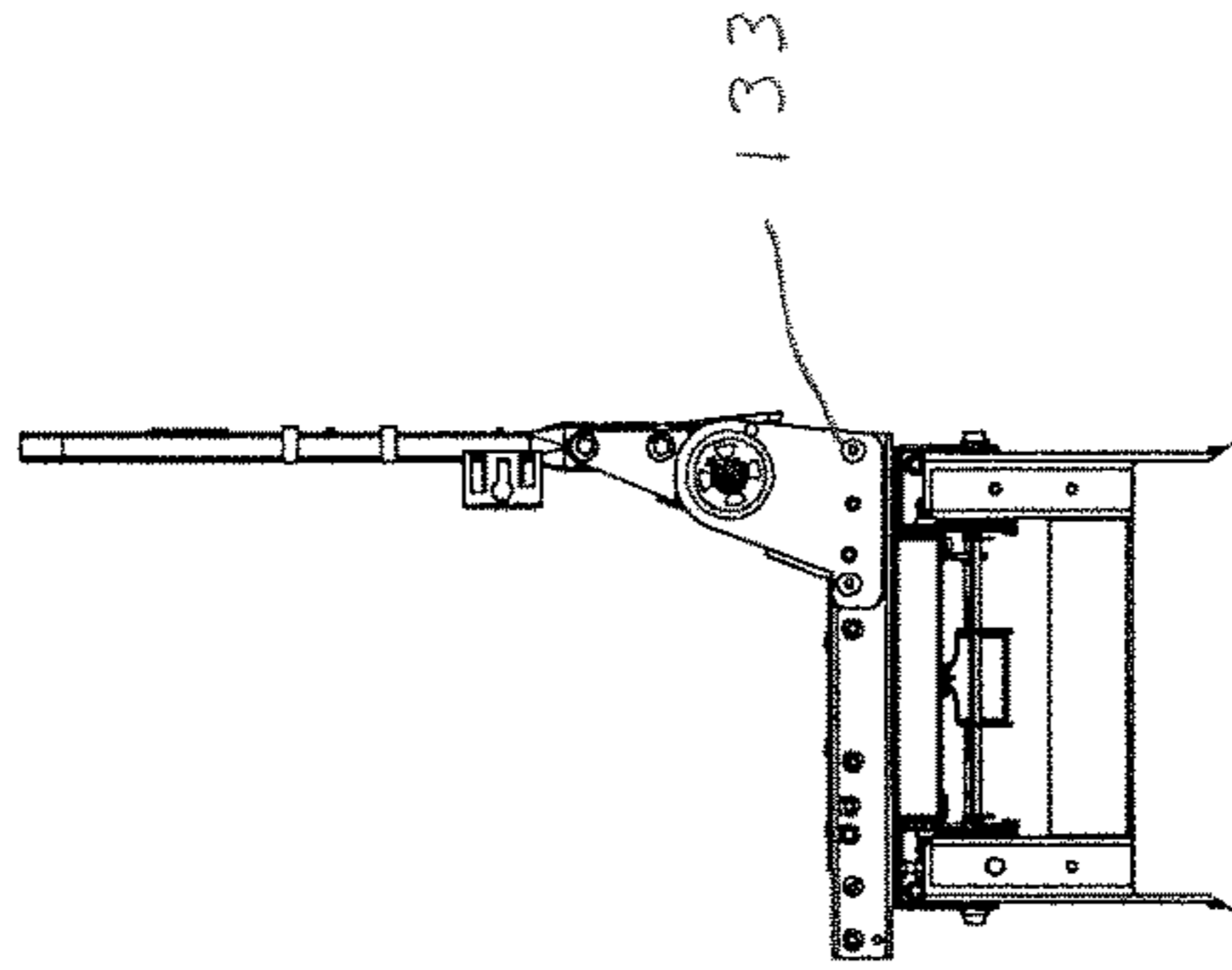
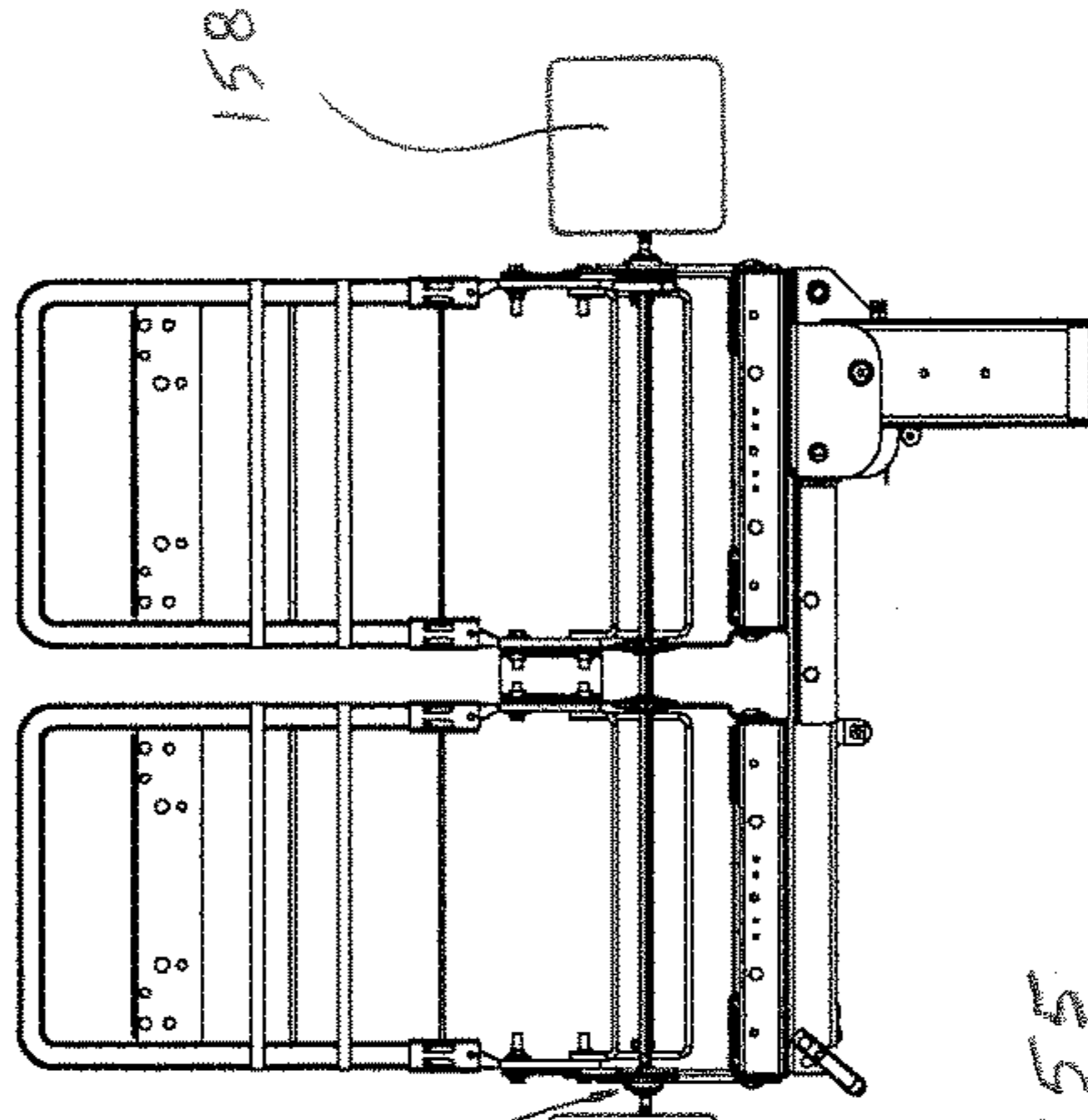


Fig. 18d

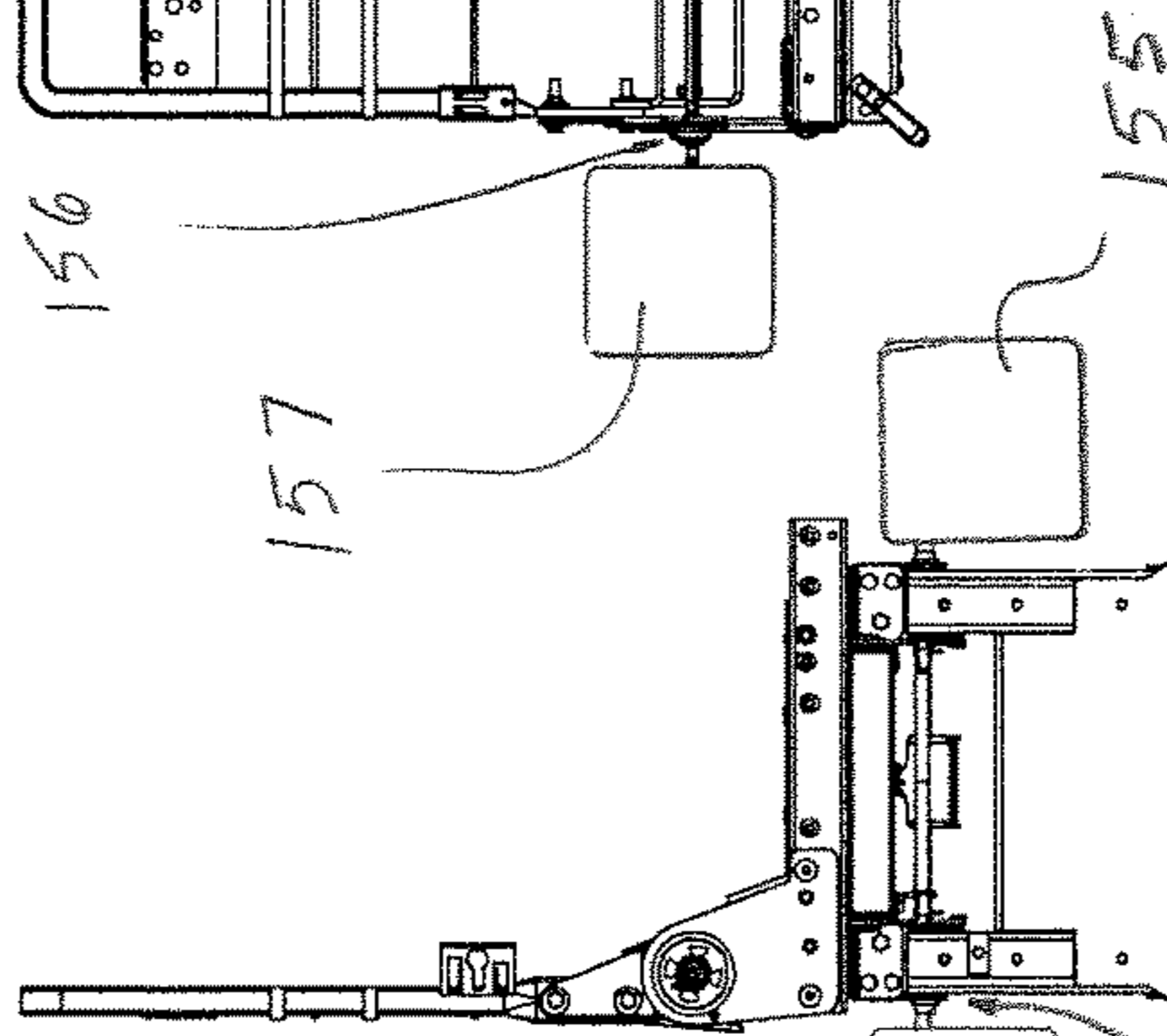


Fig. 18f

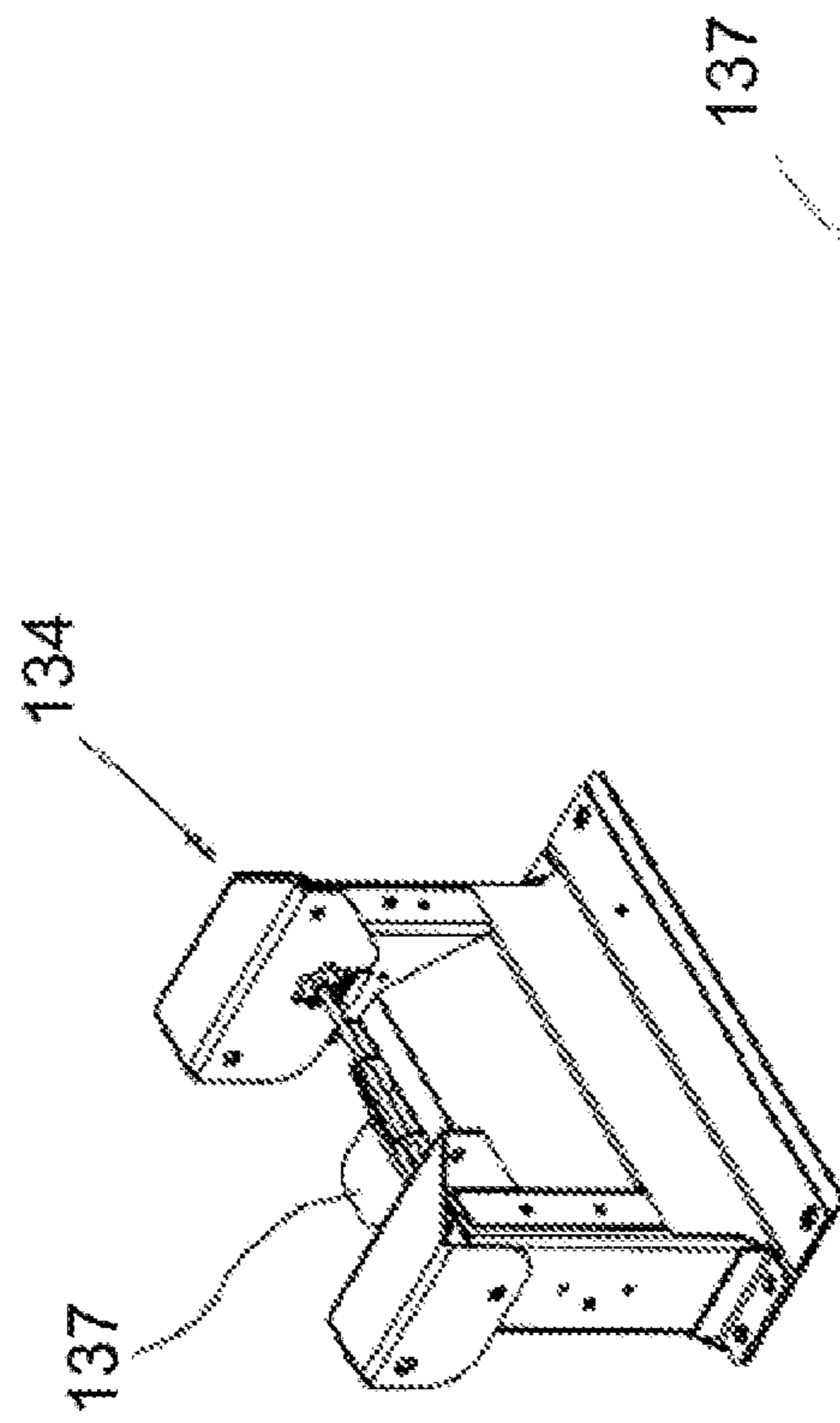


Fig. 19a

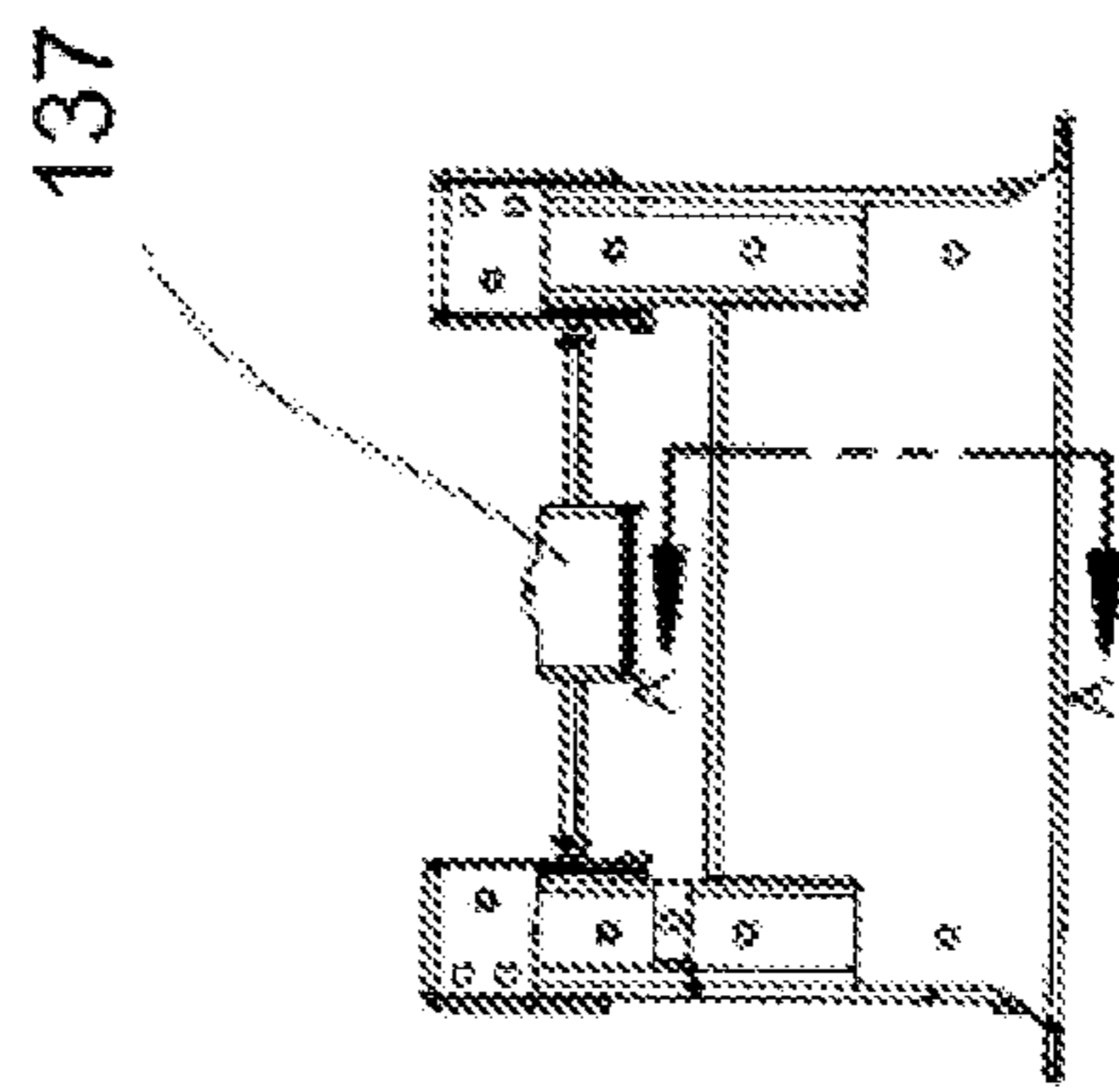


Fig. 19b

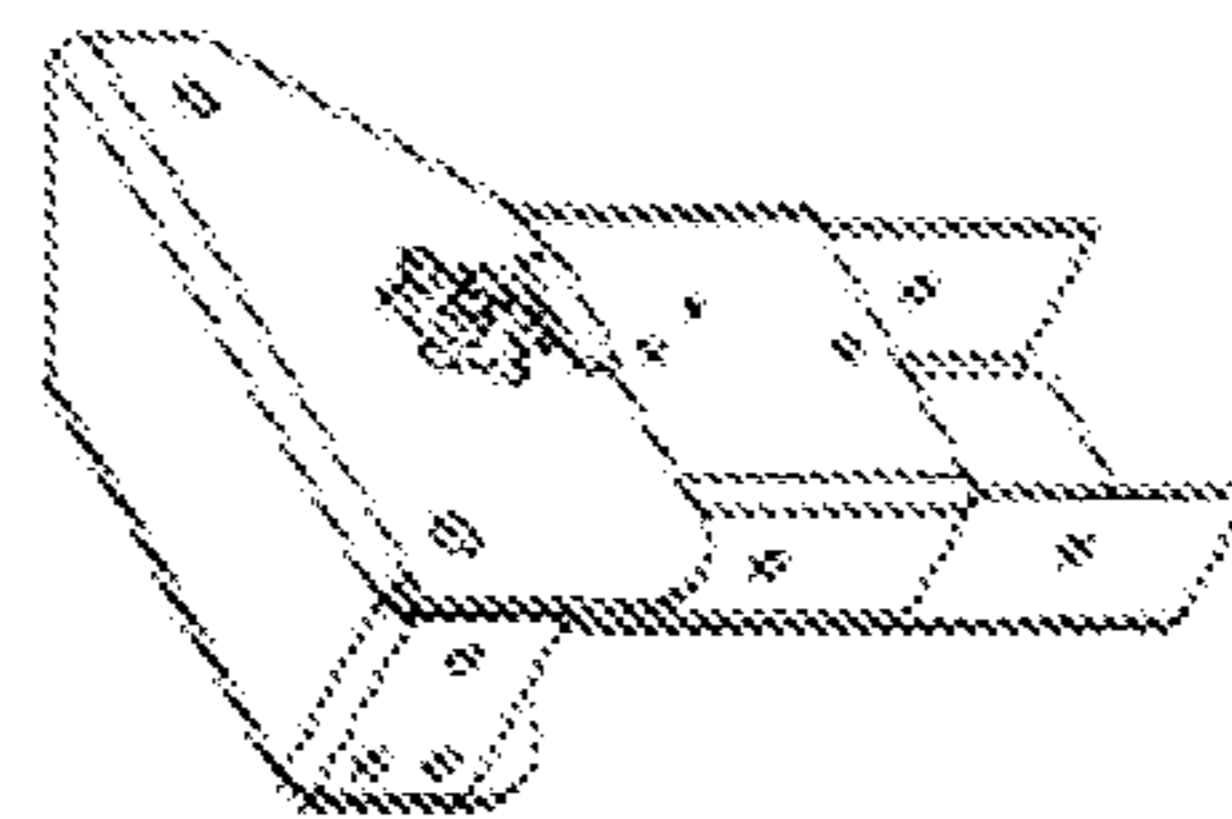


Fig. 20a

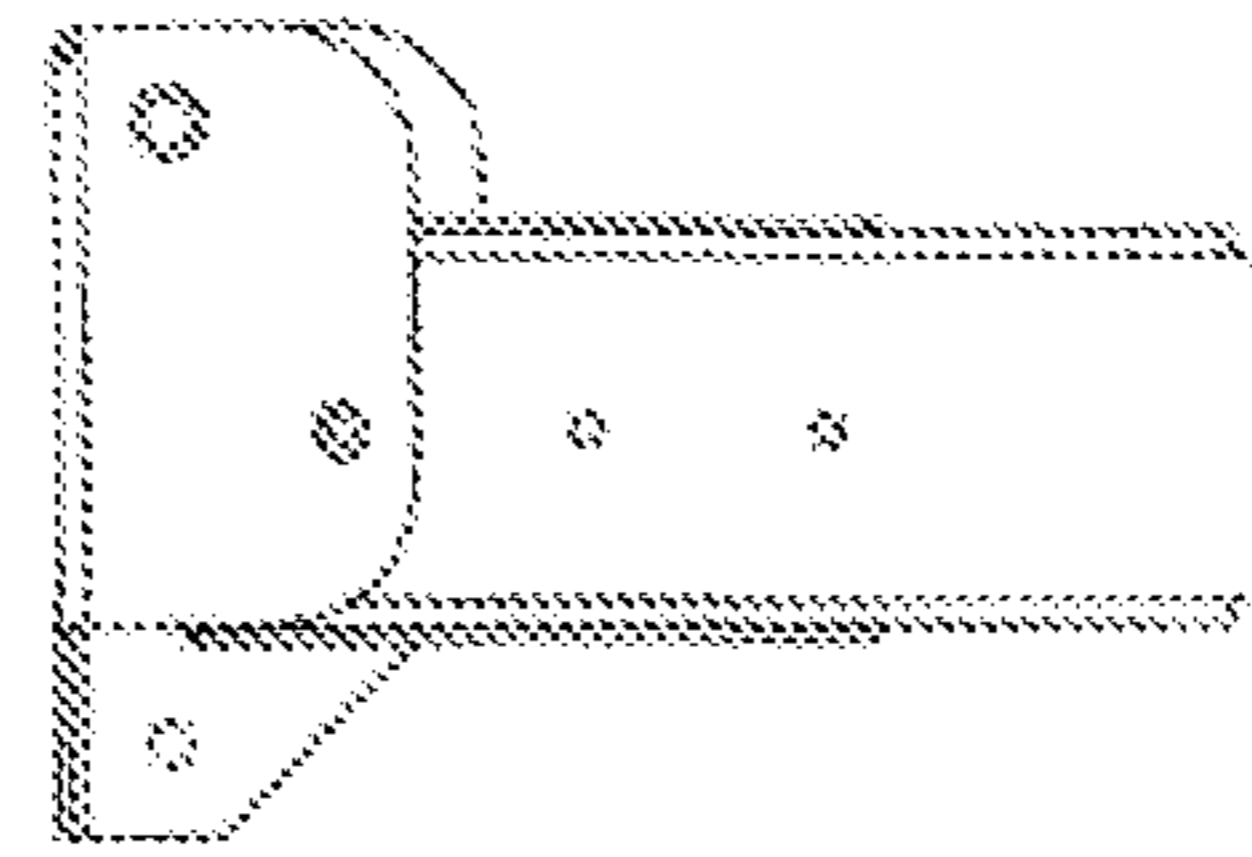


Fig. 20b

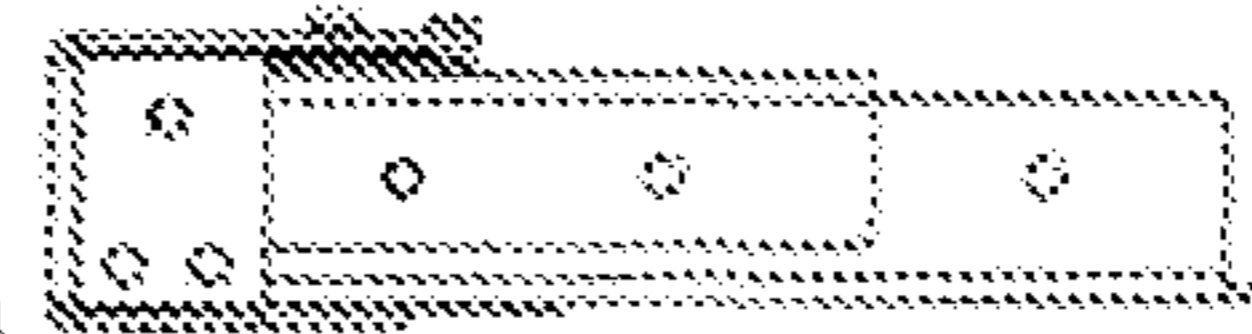


Fig. 20c

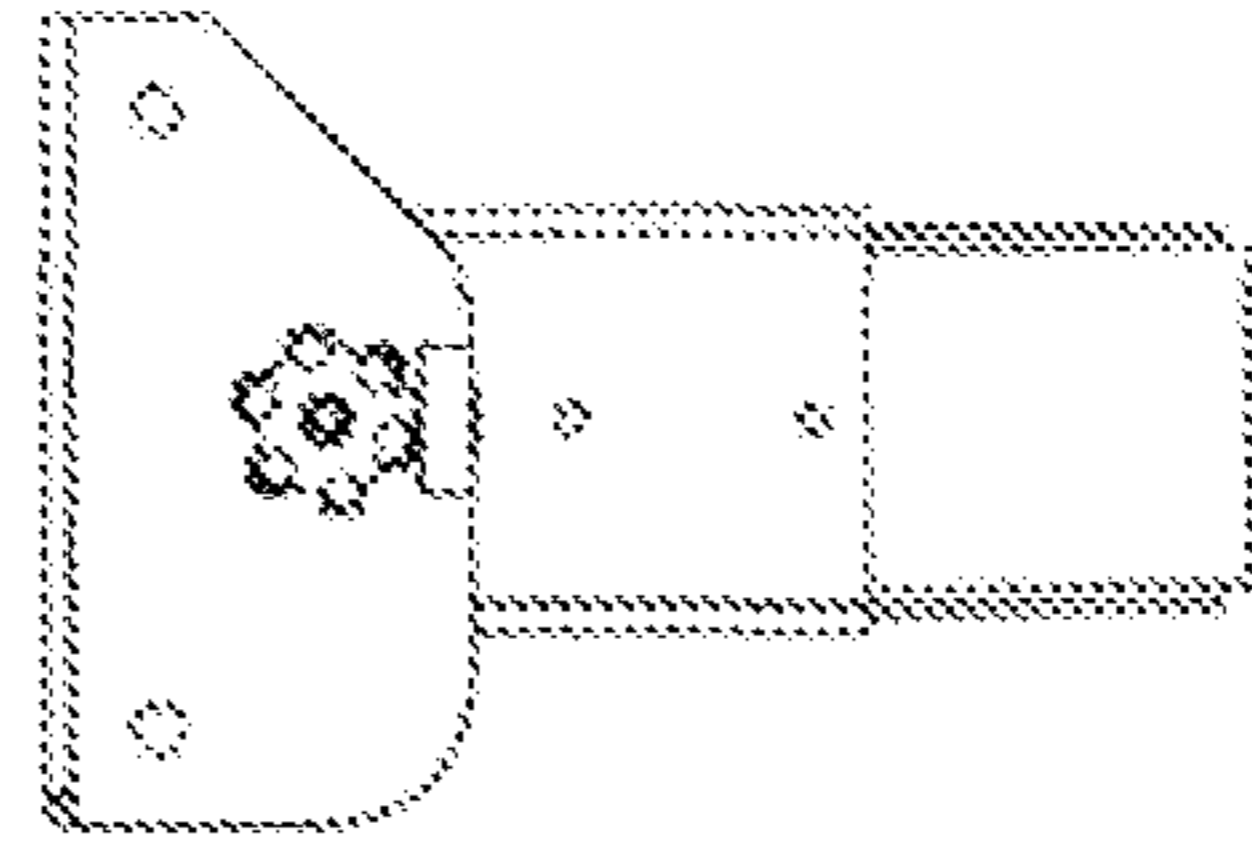


Fig. 20d

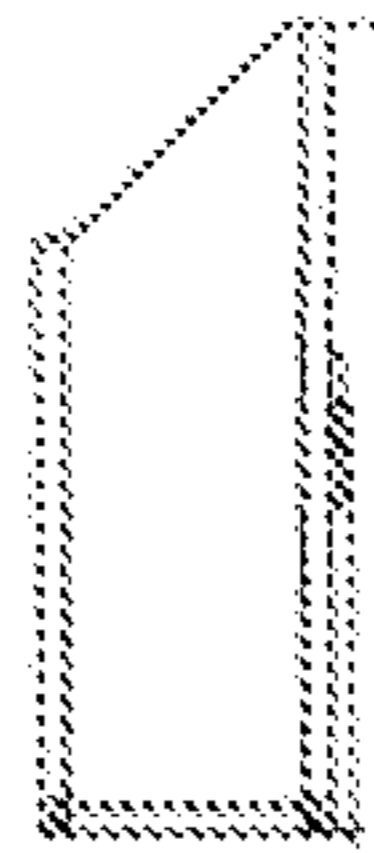


Fig. 20e

Fig. 21a

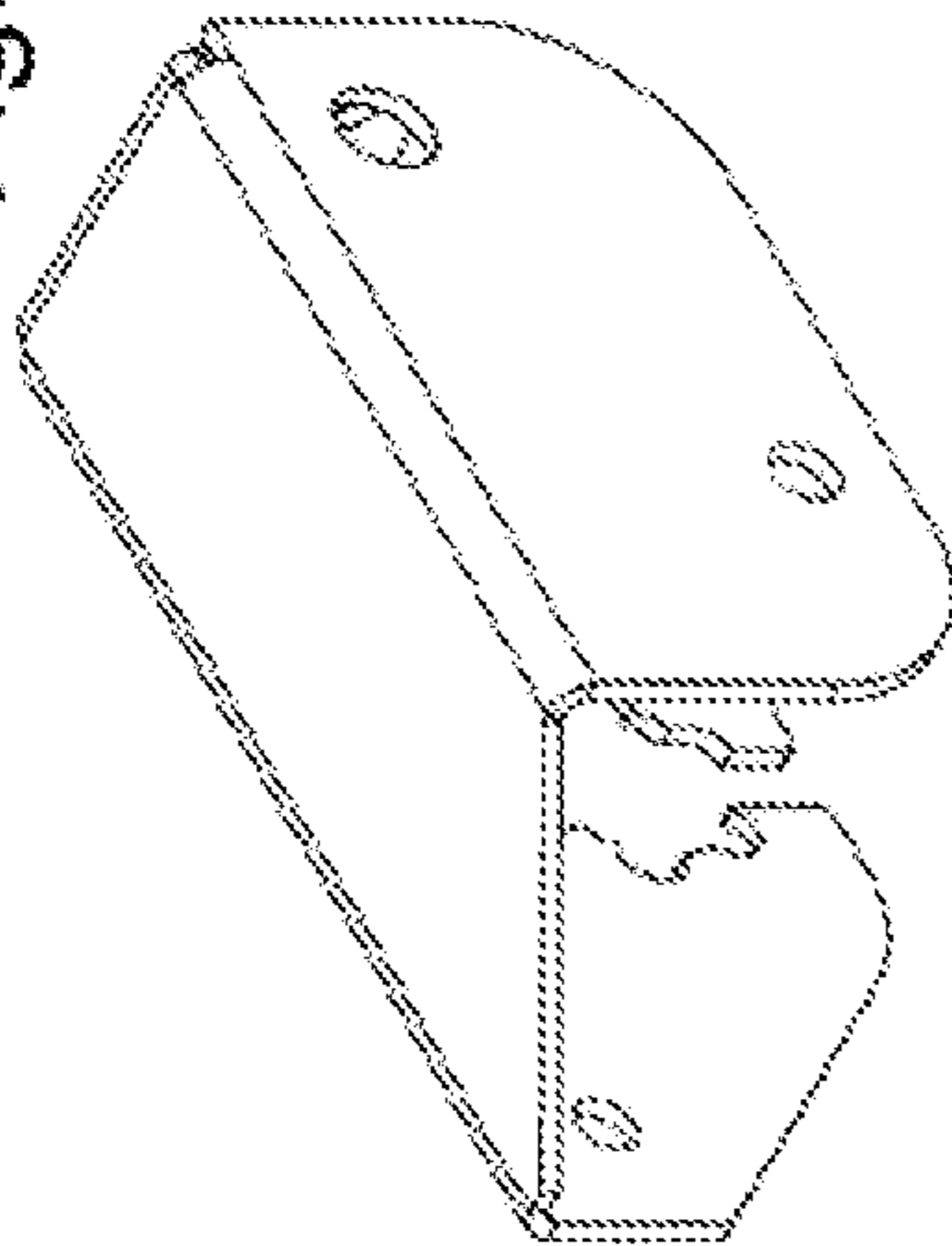


Fig. 21c

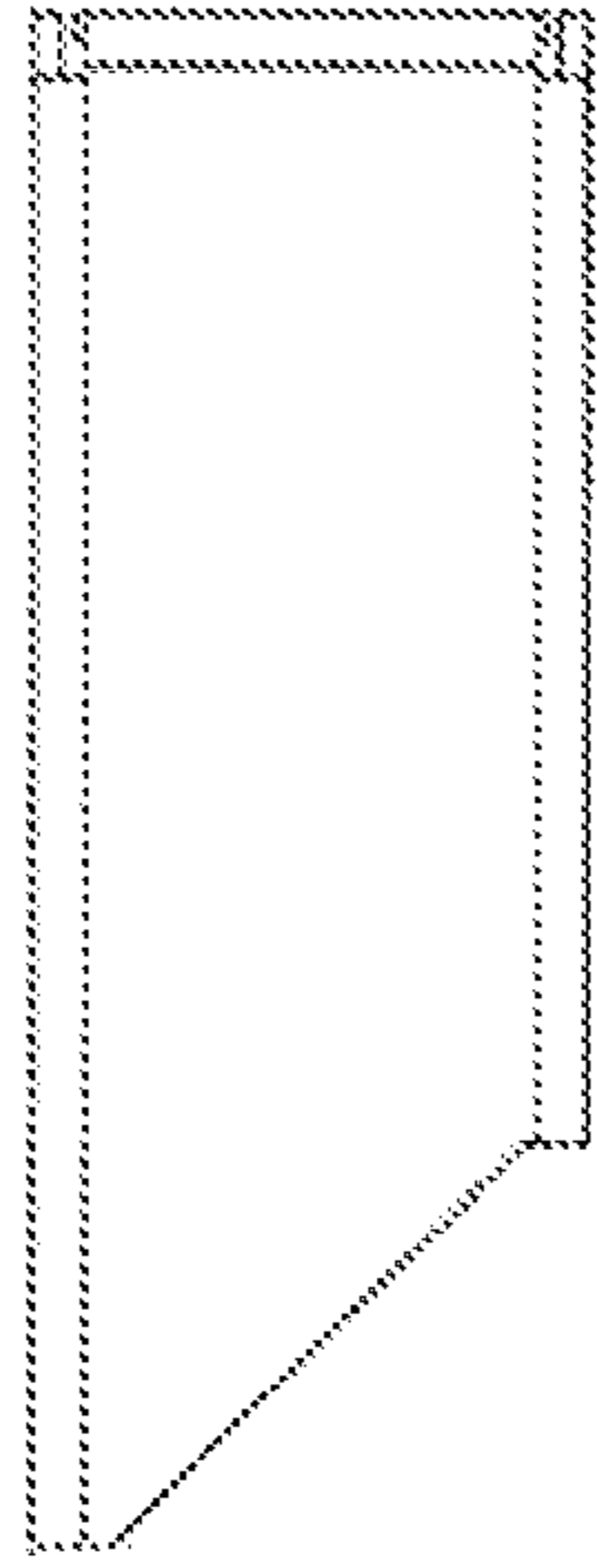


Fig. 21b

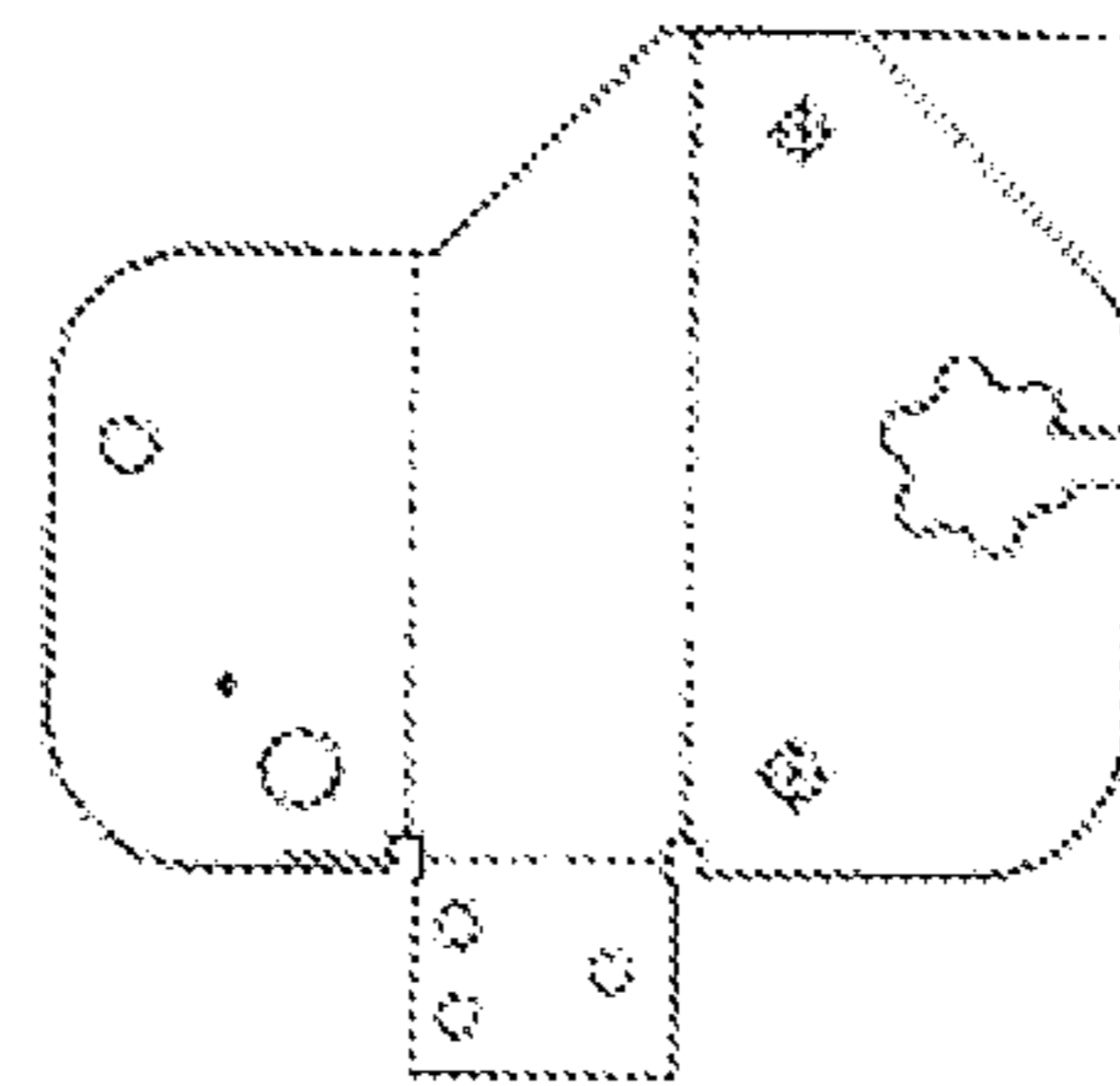
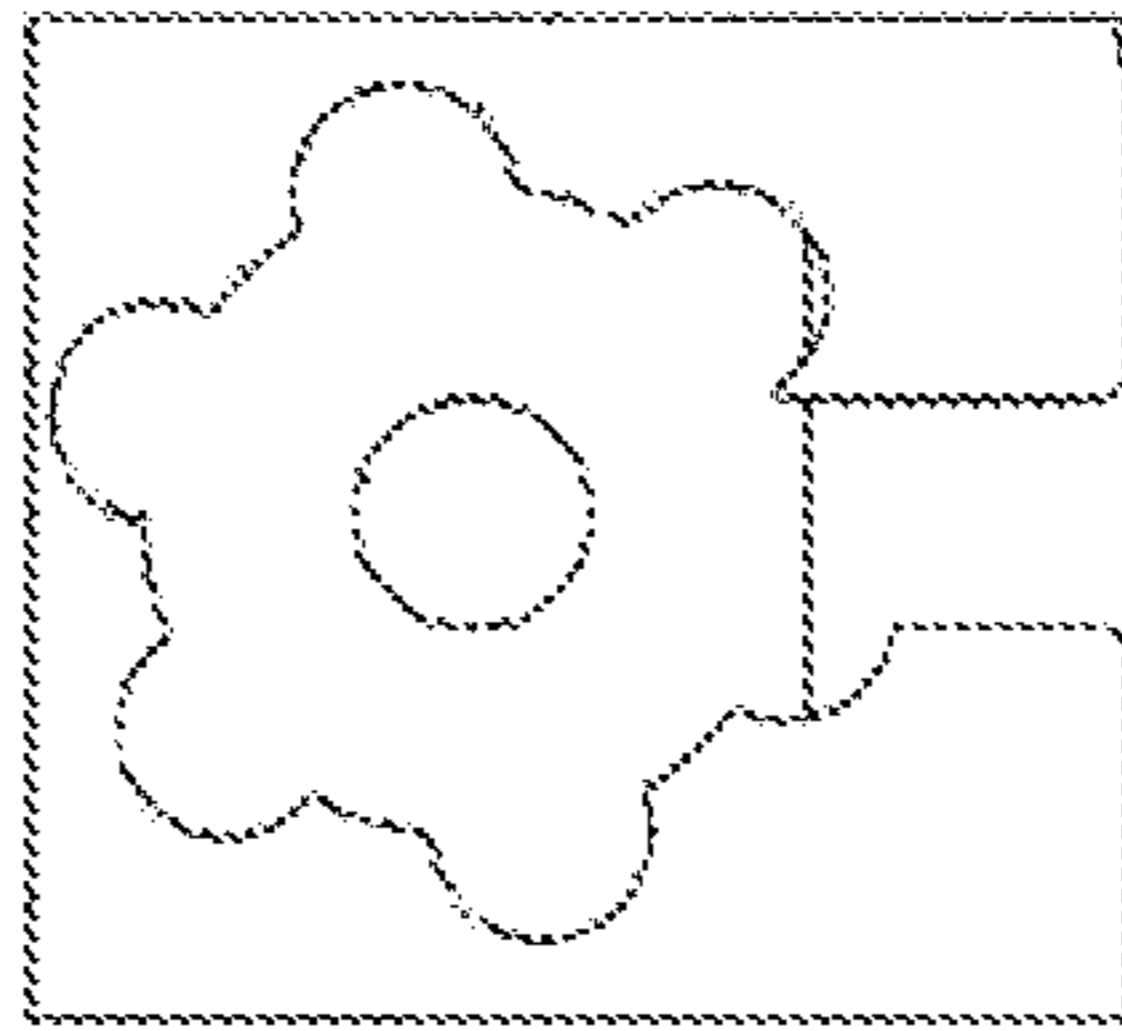


Fig. 21d

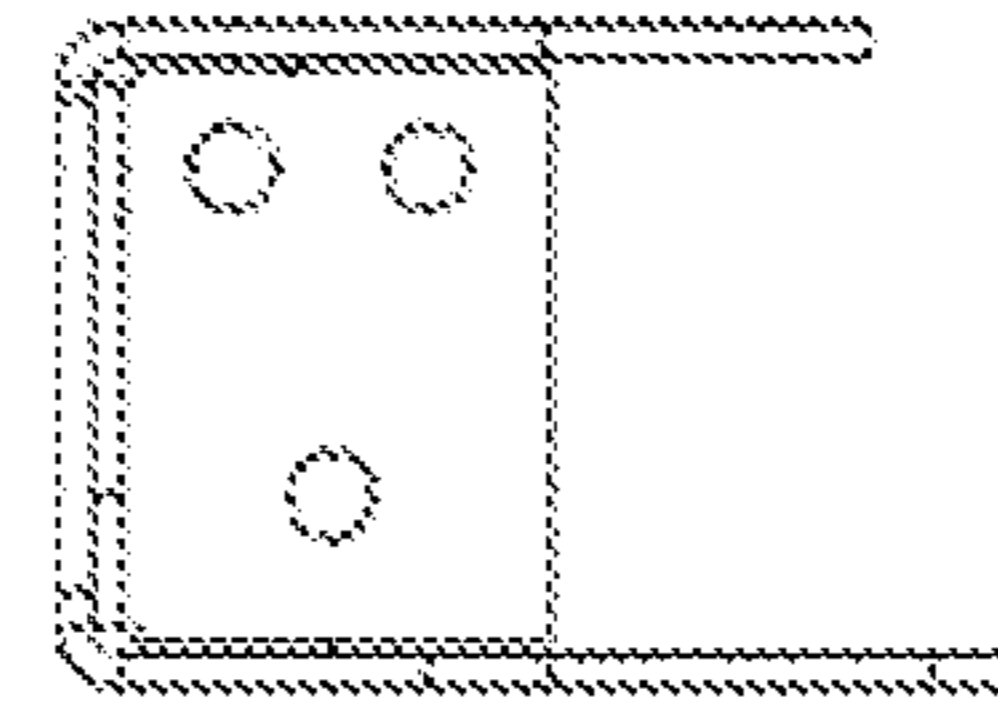


Fig. 21e

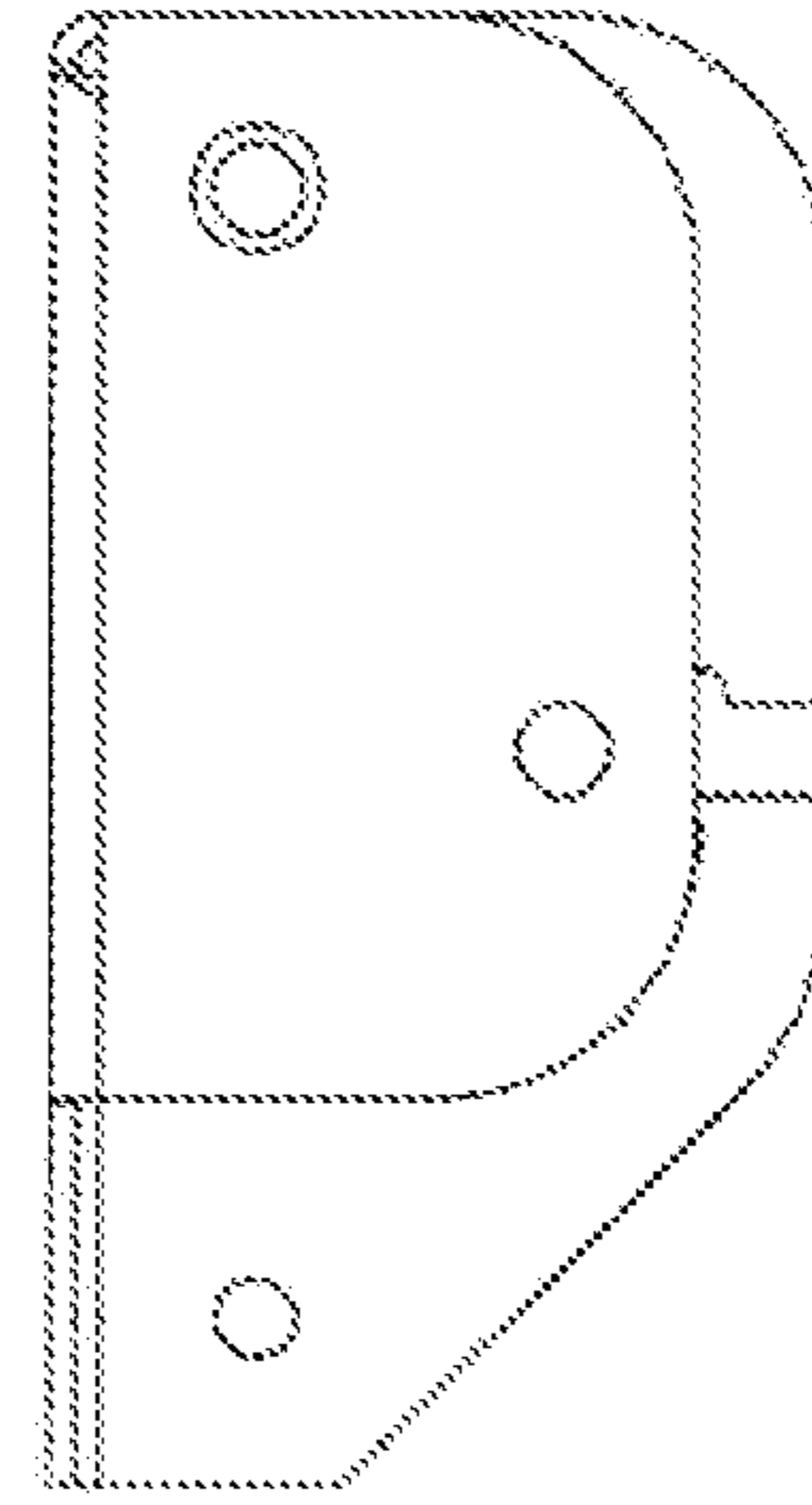


Fig. 21f

Fig. 22e

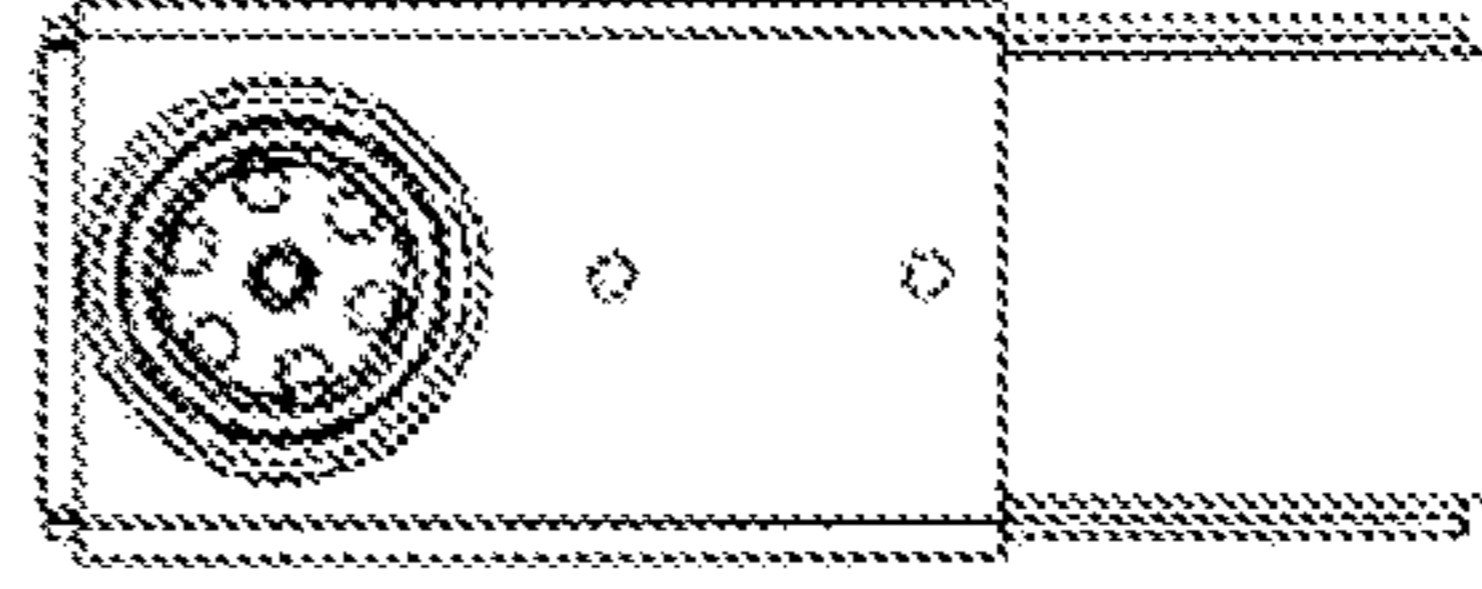
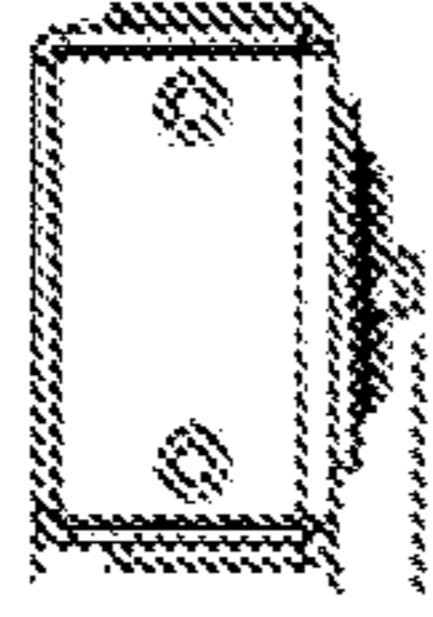


Fig. 22d

151

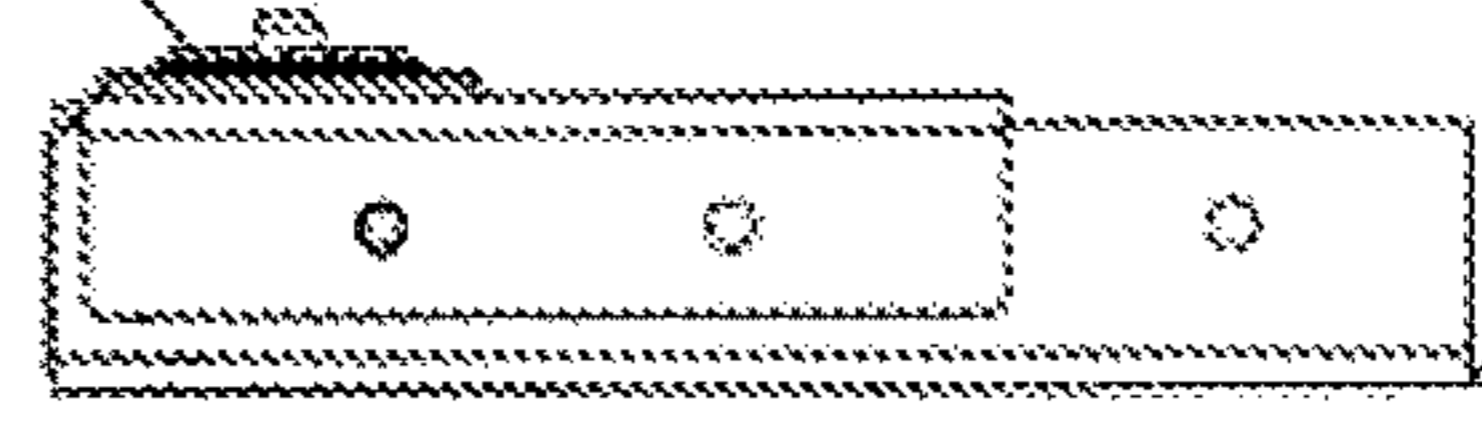
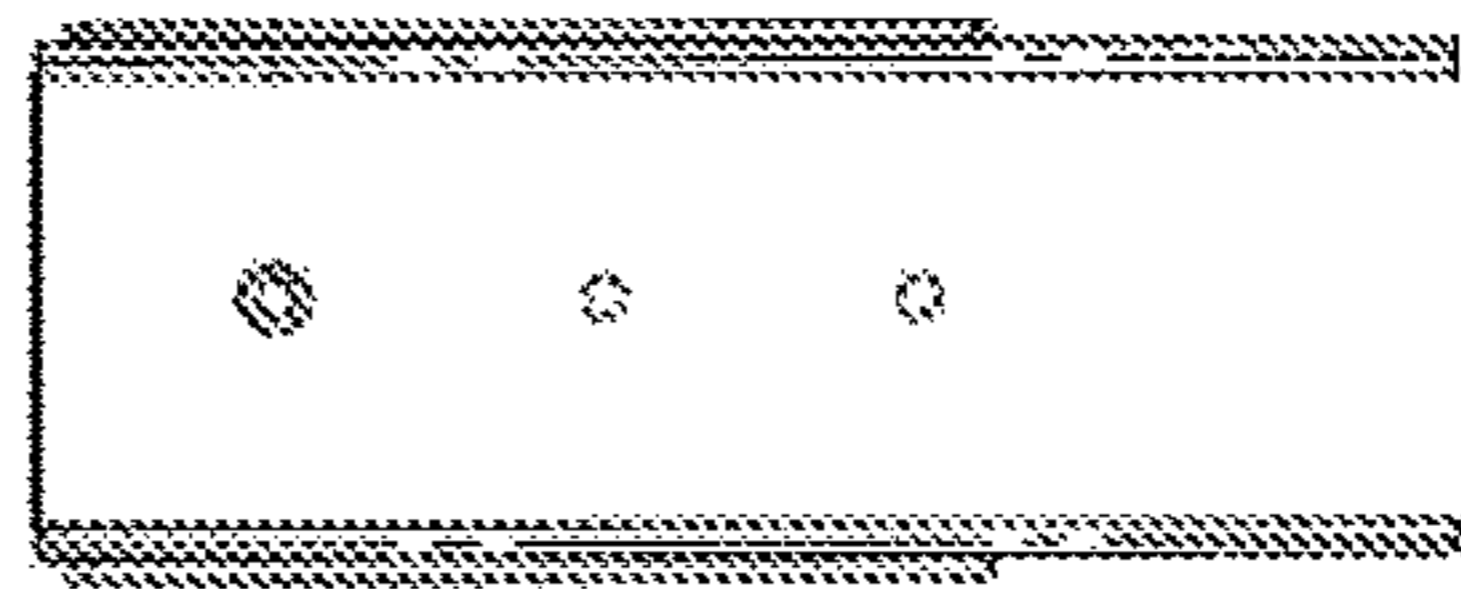


Fig. 22c

Fig. 22b



151

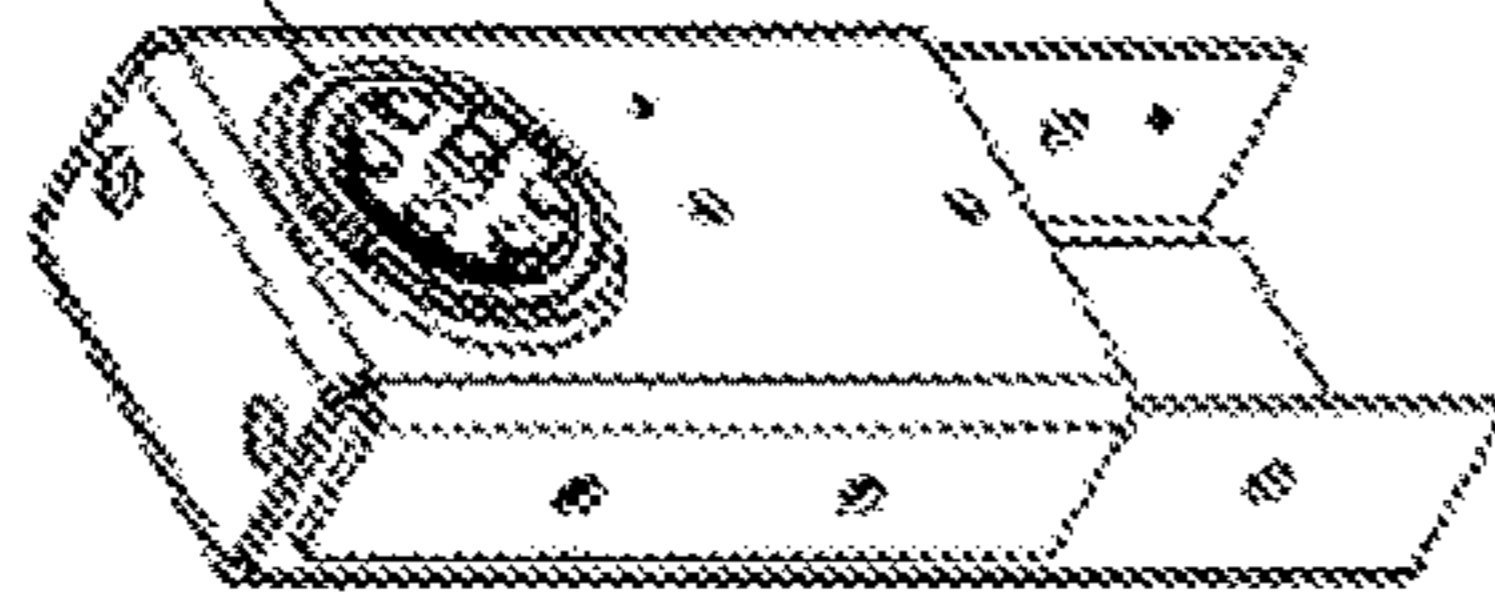


Fig. 22a

Fig. 23e

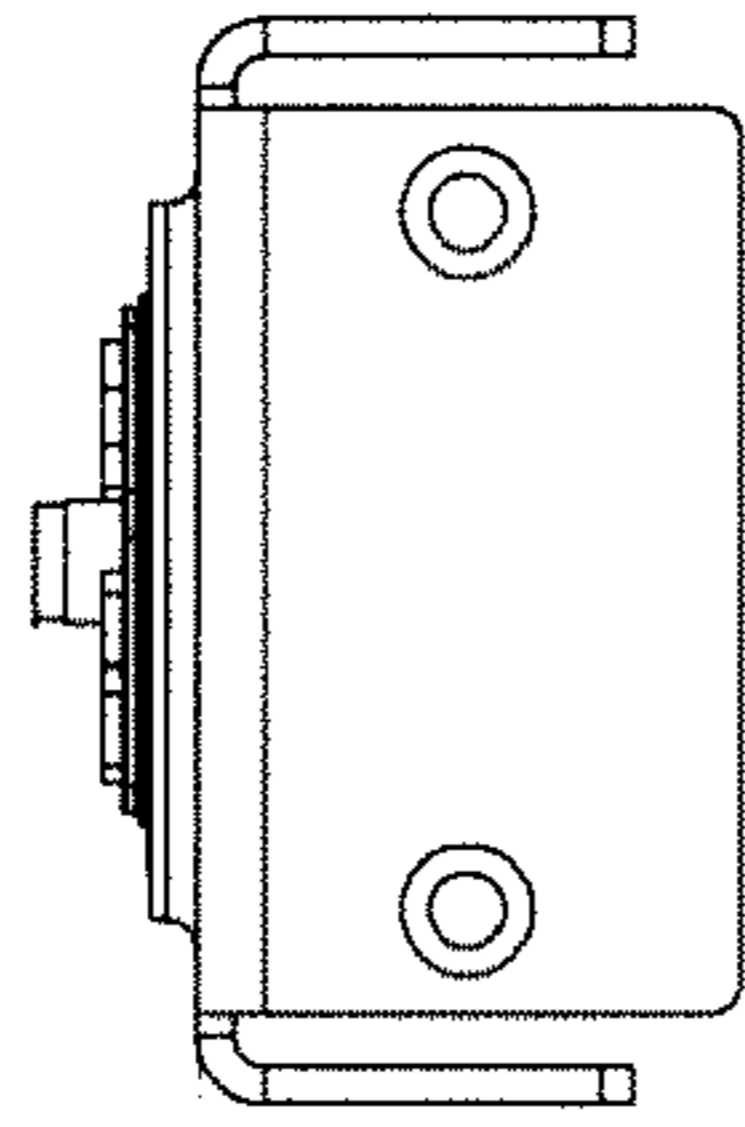


Fig. 23d

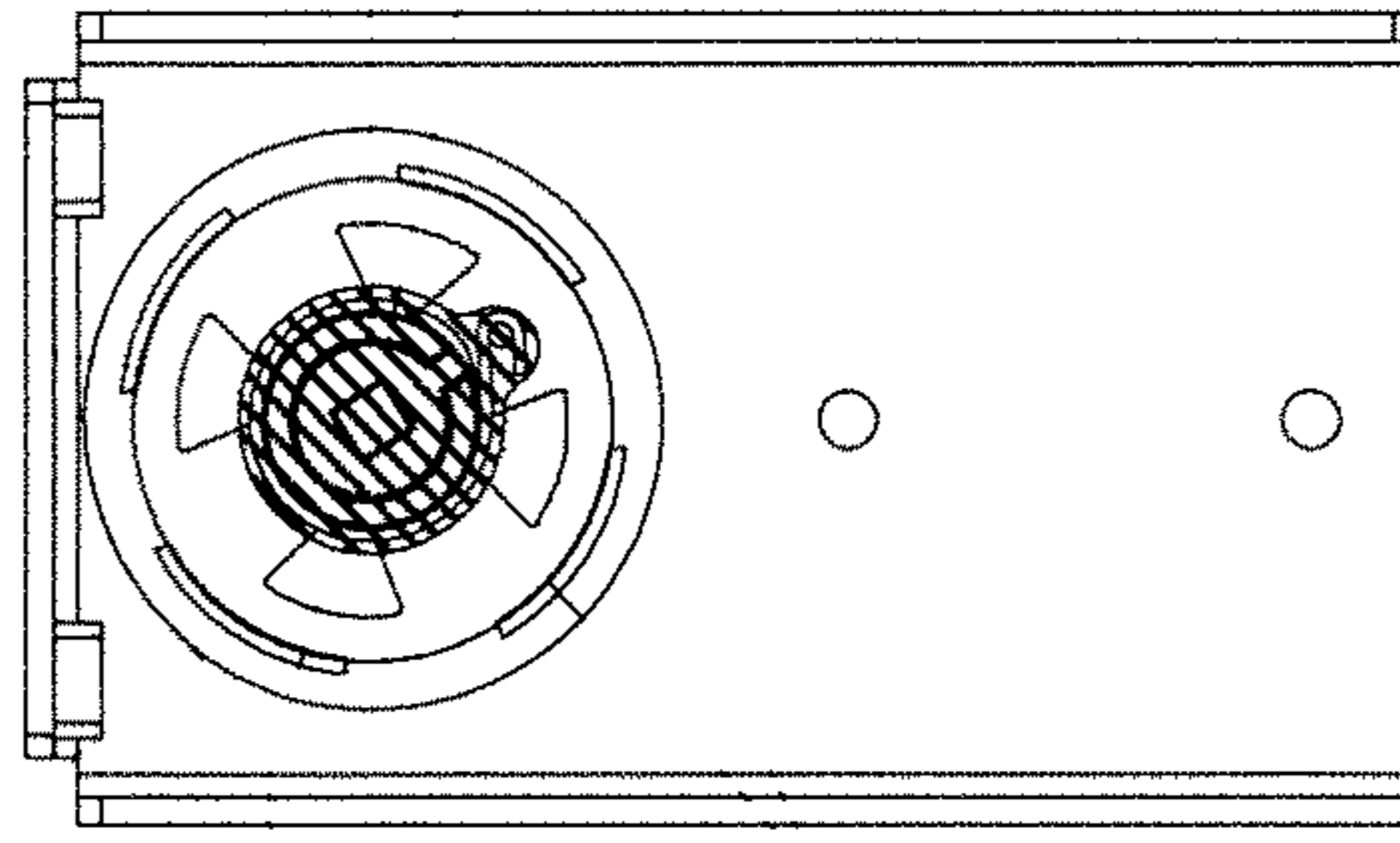


Fig. 23b

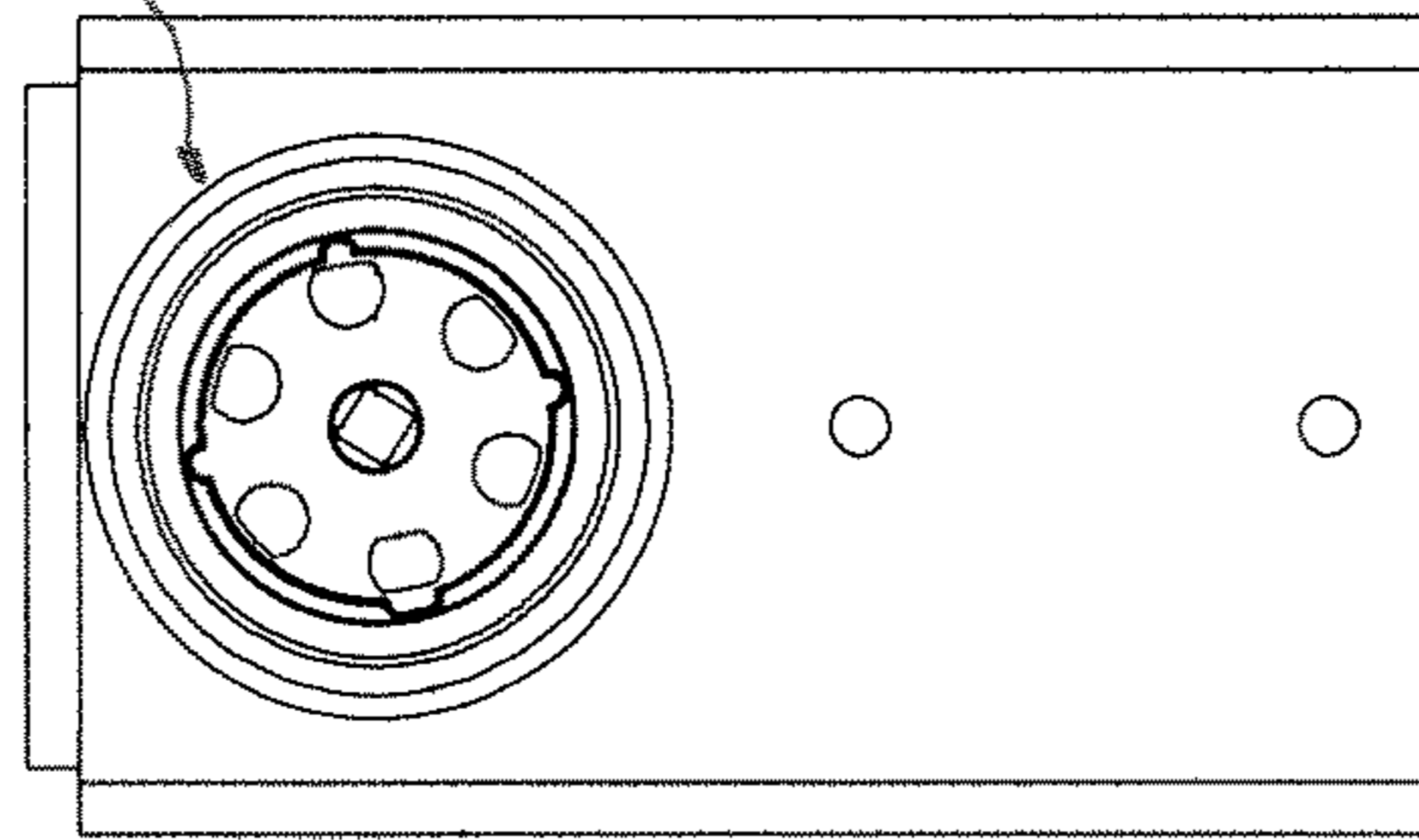
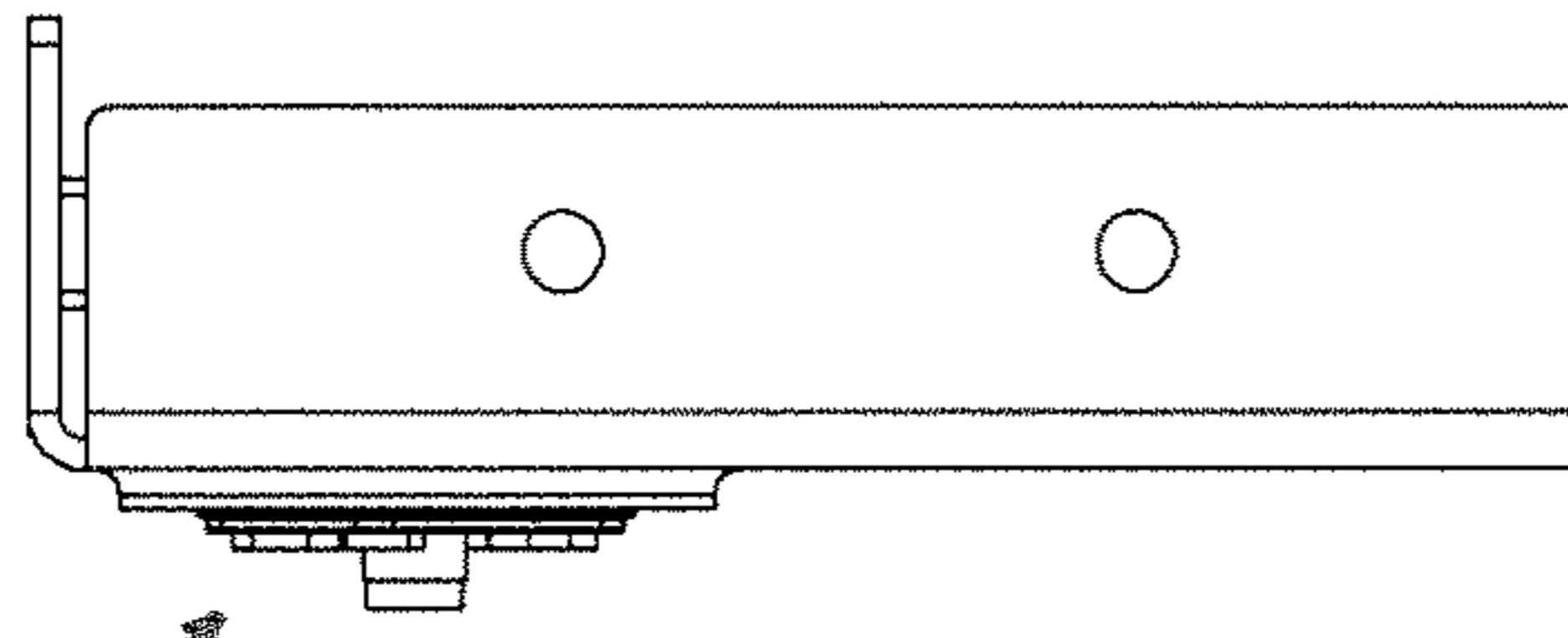


Fig. 23c



151

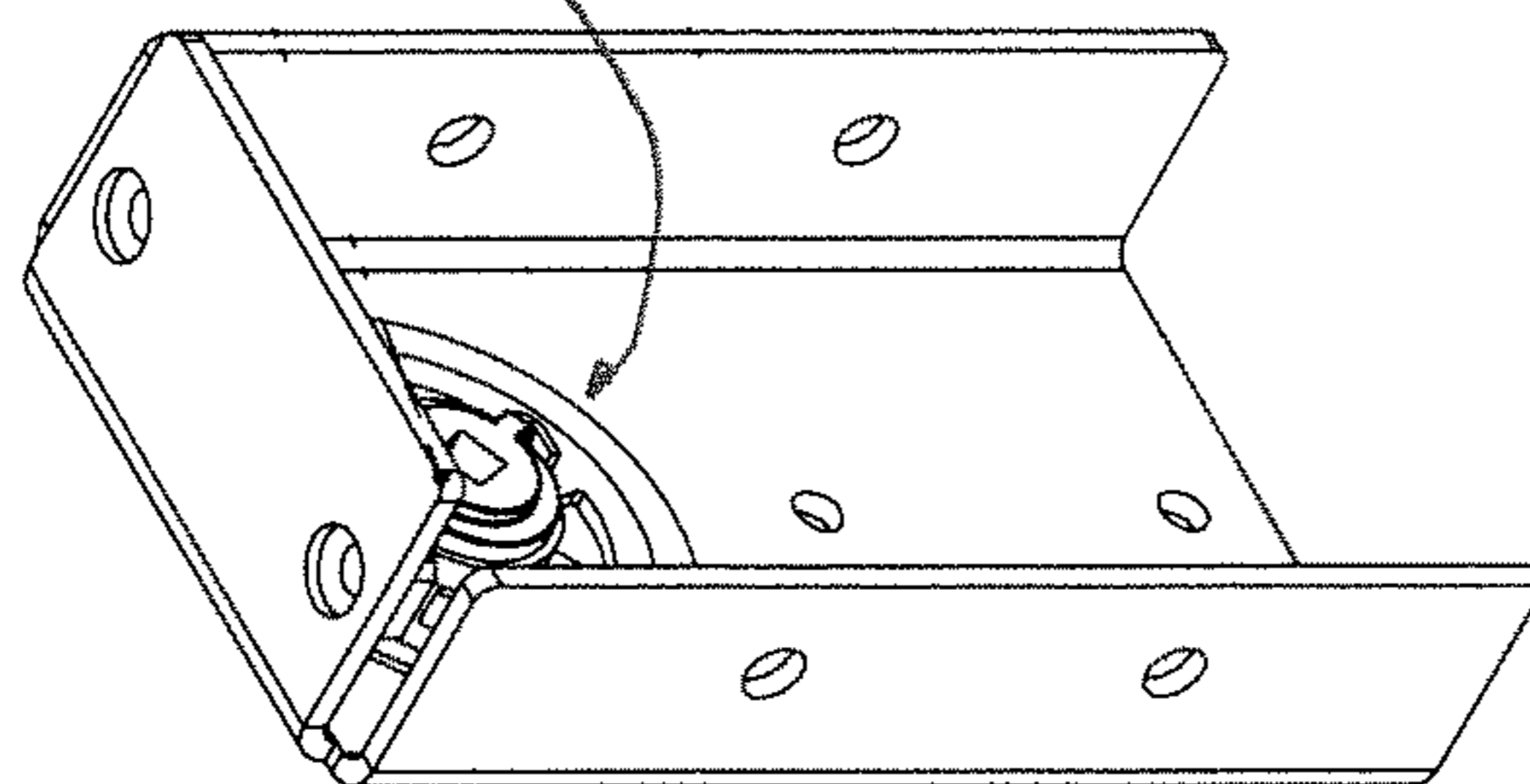


Fig. 23a

1

STOWABLE SEAT

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of and priority to U.S. Provisional Application No. 62/000,777, filed May 20, 2014, the disclosure of which is hereby incorporated herein by reference in its entirety.

BACKGROUND AND SUMMARY

The present subject matter relates generally to seating. More specifically, the present subject matter relates to a stowable seat adapted for use in a vehicle.

Provided is a stowable seat system. The provided stowable seat system, or unit, is applicable to and adapted for use in a vehicle. A variety of vehicles, such as buses and trains, often include one or more stowable seats. A stowable seat may have a deployed orientation, which occupies a space and which is usable for the seating of conventional passengers, and a stored orientation, which vacates the space otherwise occupied by the deployed seat, making the space available such that a person in a wheelchair may be positioned for transport in that space. Such a seat may be designed to accommodate at least two passengers.

In order to be stowable and be properly supportive of a passenger when deployed, conventional stowable seats are typically extremely heavy and often weigh greater than 85 pounds. Due to the weight issue, and other design factors, these seats are hard to handle. For example, many of these seats currently have a seat deck that is a structural support portion and may be very cumbersome to handle.

Further, many conventional stowable seats utilize tube-in-tube pivoting construction and several different latching mechanisms, which may require many steps in order to operate the unit when transitioning between orientations. These units are typically manually operated and in order for these latches to be operated by hand, the play in them is quite noticeable, which in turn, creates undesirable rattling, noise, vibration, or harshness while the vehicle is in motion.

It remains desirable to provide a stowable seat with improved ease of use.

Provided is a stowable seat system comprising a seat base and a seat frame operationally engaged with the seat base. The seat base includes a vehicle engagement portion adapted for operational engagement with an associated vehicle, and a seat engagement portion movably engaged with the vehicle engagement portion at a first actuation region. The seat frame includes a bottom portion, and a back portion movably engaged with the bottom portion at a second actuation region.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 is a perspective view of an embodiment of a stowable seat system including two seat frames on a seat base, all in their deployed orientations.

FIG. 2 is a view similar to FIG. 1, except with the seat frames having their seat back portions in their stowed orientations.

FIG. 3 is a view similar to FIG. 2, with the seat system in a stowed orientation.

FIG. 4 is an enlarged view of the seat base similar to FIG. 1 except with the seat frames removed.

FIG. 5 is a view similar to FIG. 4, except also including a wall mount.

2

FIG. 6a is a perspective view of the seat base.

FIG. 6b is a top view of the seat base.

FIG. 6c is a sectional view of the seat base taken along lines A-A in FIG. 6e.

FIG. 6d is a side view of the seat base.

FIG. 6e is an end view of the seat base.

FIG. 7 is a photographic view of the seat base in the deployed orientation from a first side.

FIG. 8 is a photographic view of the seat base in the deployed orientation from a second side.

FIG. 9 is an enlarged view of a portion of FIG. 8.

FIG. 10 is a photographic view of the seat base in the stowed orientation from the second side.

FIG. 11 is an enlarged view of a portion of the seat base in the stowed orientation from the front.

FIG. 12 is an enlarged view of a portion of the seat base in the stowed orientation from the second side.

FIG. 13 is a photographic view of the stowable seat system, including seat covers, in the deployed orientation.

FIG. 14 is a front photographic view of the stowable seat system, including seat covers, in the fully stowed orientation.

FIG. 15 is a photographic view of the stowable seat system, including seat covers, in an intermediate stowing orientation with the seat back portions folded over the seat bottom portions of the seat frames.

FIG. 16 is another photographic view of the stowable seat system, including seat covers, in an intermediate stowing orientation with the seat back portions folded over the seat bottom portions of the seat frames.

FIG. 17a is a perspective view of the seat base.

FIG. 17b is a top view of the seat base.

FIG. 17c is an enlarged view of one part of the seat base at taken from the location indicated in FIG. 17f.

FIG. 17d is a first sectional view of a portion of the seat base of FIG. 17b.

FIG. 17e is a second sectional view of a portion of the seat base of FIG. 17b.

FIG. 17f is a first end view of the seat base.

FIG. 17g is a side view of the seat base.

FIG. 17h is a second end view of the seat base.

FIG. 18a shows a first perspective view of a stowable seat system.

FIG. 18b shows a top view of the stowable seat system.

FIG. 18c shows a second perspective view of the stowable seat system.

FIG. 18d shows a first end view of the stowable seat system.

FIG. 18e shows a side view of the stowable seat system.

FIG. 18f shows a second end view of the stowable seat system.

FIG. 19a shows a perspective view of part of the seat base.

FIG. 19b shows an end view of part of the seat base.

FIG. 20a is a perspective view of part of the seat base.

FIG. 20b is a first side view of a part of the seat base.

FIG. 20c is an end view of a part of the seat base.

FIG. 20d is a second side view of a part of the seat base.

FIG. 20e is a top view of a part of the seat base.

FIG. 21a is a perspective view of another part of the seat base.

FIG. 21b is an enlarged side view of a portion of the part of the seat base.

FIG. 21c is a first side view of the part of the seat base.

FIG. 21d shows a plan view of the stamped part of the seat base before bending.

FIG. 21e shows an end view of the part of the seat base.

FIG. 21*f* shows a second side view of the part of the seat base.

FIG. 22*a* shows a perspective view of yet another part of the seat base.

FIG. 22*b* shows a first side view of the part of the seat base.

FIG. 22*c* shows an end view of the part of the seat base.

FIG. 22*d* shows a second side view of the part of the seat base.

FIG. 22*e* shows a top view of the part of the seat base.

FIG. 23*a* shows a perspective view of even another part of the seat base.

FIG. 23*b* shows a first side view of the part of the seat base.

FIG. 23*c* shows an end view of the part of the seat base.

FIG. 23*d* shows a second side view of the part of the seat base.

FIG. 23*e* shows a top view of the part of the seat base.

DETAILED DESCRIPTION

Referring now to the drawings, there is illustrated in FIGS. 1-23*e* an embodiment of a stowable seat system 100 which includes a seat base 120 and one or more seat frames 160 operationally engaged with the seat base 120. The stowable seat system 100 may be used in buses, trains, and other transit vehicles that provides access for wheelchair occupants or other use of the space. The stowable seat system 100, when deployed, may act as a passenger seat. When stowed, the stowable seat system 100 provides access to floor space, allowing a wheelchair and occupant to occupy that space.

The seat base 120 includes a vehicle engagement portion 130 and a seat engagement portion 140 operationally engaged with the vehicle engagement portion 130. The vehicle engagement portion 130 includes one or more features to permit engagement with an associated vehicle (not shown).

As shown in FIG. 4, the vehicle engagement portion 130 is adapted for engagement with the floor (not shown) of an associated vehicle (not shown). A vehicle engagement portion 130 adapted for engagement with a floor may include a floor mating feature 132. The floor mating feature 132 is engaged, directly or indirectly, to the floor (not shown) with one or more mechanical engagement components 133. The mechanical engagement component 133 may be or include, but is not limited to, a mechanical fastener, such as a nut, bolt, rivet, pin, clip, or clamp; an adhesive; a weld joint; a brazing joint; a soldering joint; or other component adapted to provide similar physical engagement forces. Engaged with, and vertically offset from, the floor mating feature 132 is a first actuation region 134. The first actuation region 134 is adapted to permit seat engagement portion 140 and the vehicle engagement portion 130 to be moved with respect to one another. In the embodiment shown in FIGS. 1-23*e* the first actuation region 134 includes a pivot defining a first axis of rotation 135 that is substantially parallel to the floor such that seat engagement portion 140 may be rotated about the first axis of rotation 135 from the substantially horizontal orientation similar to that shown in FIGS. 1 and 4 to a substantially vertical orientation similar to that shown in FIGS. 3 and 10. In other acceptable embodiments, the first actuation region 134 may include a mechanism, such as, without limitation, a linkage, adapted to permit seat engagement portion 140 to be moved from a substantially horizontal orientation to a substantially vertical orientation.

As shown in FIG. 5, the vehicle engagement portion 130 is adapted for engagement with a wall (not shown) of an associated vehicle (not shown). A vehicle engagement portion 130 adapted for engagement with a wall includes an optional wall mating feature 136. The wall mating feature 136 is engaged, directly or indirectly, to the wall (not shown) with one or more mechanical engagement components 133. As noted above, a mechanical engagement component 133 may be or include, but is not limited to, a mechanical fastener, such as a nut, bolt, rivet, pin, clip, or clamp; an adhesive; a weld joint; a brazing joint; a soldering joint; or other component adapted to provide similar physical engagement forces. Engaged with, and horizontally offset from, the wall mating feature 136 is first actuation region 134. The first actuation region 134 is adapted to permit seat engagement portion 140 and the vehicle engagement portion 130 to be moved with respect to one another. In the embodiment shown in FIGS. 1-23*e* the first actuation region 134 includes a pivot defining a first axis of rotation 135 that is substantially parallel to the wall such that seat engagement portion 140 may be rotated about the first axis of rotation 135 from the substantially horizontal orientation similar to that shown in FIGS. 1 and 5 to a substantially vertical orientation similar to that shown in FIGS. 3 and 10. In other acceptable embodiments, the first actuation region 134 may be or include a mechanism, such as, without limitation, a linkage, adapted to permit seat engagement portion 140 to be moved from a substantially horizontal orientation to a substantially vertical orientation.

As shown in FIGS. 19-23*e* the first actuation region 134 is operationally engaged with a selectably releasable lock 151 adapted to hold the seat engagement portion 140 in a desired orientation with respect to the vehicle engagement portion 130. In one embodiment the selectably releasable lock may be a Fisher Dynamic brand heart hinge, part number 56118. The lock 151 may be selectably releasable by a lever or other manual latch 137. As shown in FIG. 18*f*, the lock 151 may be selectably releasable by a solenoid, motor, or other actuator 154 adapted to move the selectably releasable lock 151 into a desired orientation. As shown in the non-limiting embodiment in FIG. 18*f*, the lock 151 may be engaged with a proximity switch or other sensor 155 adapted to detect the state of lock 151. It should be understood that, in other embodiments, one or more sensors 155 could be used to detect the orientation of one or more components of the stowable seat system 100.

As will be described in further detail below, the seat base 120 supports one or more seat frames 160 on the seat engagement portion 140 with the seat engagement portion 140 engaged in a cantilever arrangement with respect to the vehicle engagement portion 130. In some embodiments, it is desirable for the seat engagement portion 140 to resist substantial deflection even when subjected to a substantial load. In some embodiments, the stowable seat system 100 and the components thereof meet or surpass the relevant Federal Motor Vehicle Safety Standards. In some embodiments, the stowable seat system 100 and the components thereof meet or surpass by 115% the Federal Motor Vehicle Safety Standard No. 207 for Multipurpose Passenger Vehicles, Trucks, and Buses as it existed on May 20, 2014. In some embodiments the components of the stowable seat system 100 may include one or more metal structural members 112. The metal structural members 112 may be formed, in whole or part, from iron, iron alloy, steel, stainless steel, aluminum, aluminum alloy, or other structural material commonly selected for use in vehicle compo-

nents. In one embodiment, a stowable seating unit weighs less than a conventional stowable seating unit.

The seat frame **160** includes a bottom portion **170** and a back portion **180** operationally engaged with the bottom portion **170**. The bottom portion **170** includes one or more seat mounting features **172** to permit mechanical engagement with the seat base **120**. In some embodiments, the seat mounting features **172** may include a through hole adapted to operationally engage a mechanical engagement component **133**. The bottom portion is adapted to support a seating surface **174** adapted for a user to sit upon. The seating surface **174** may be a pad or cushion engaged with the bottom portion **170**. Engaged with the bottom portion **170** is a second actuation region **176**. The second actuation region **176** is adapted to permit back portion **180** and the bottom portion **170** to be moved with respect to one another. In the embodiment shown in FIGS. **1-23e** the second actuation region **176** includes a pivot defining a second axis of rotation **177** such that back portion **180** may be rotated about the second axis of rotation **177** from the deployed orientation similar to that shown in FIGS. **1** and **13** to a stowing orientation similar to that shown in FIGS. **2** and **15**. As shown in FIGS. **1-23e**, in some embodiments the second axis of rotation **177** is offset from the first axis of rotation **135** wherein the offset is defined by a vector perpendicular to both the second axis of rotation **177** and the first axis of rotation **135**, and wherein a projection of the second axis of rotation **177** into a plane normal to the first vector is perpendicular to a projection of the first axis of rotation **135** into the plane normal to the first vector. In other acceptable embodiments, the second actuation region **176** may include a mechanism, such as, without limitation, a linkage, adapted to permit back portion **180** to be moved from the deployed orientation to the stowing orientation. The second actuation region **176** may further be adapted to permit the back portion **180** to be oriented within a range of orientations close to the deployed orientation and thereby angled forwardly or rearwardly to allow a user to select a desired amount of recline in his seat. In one embodiment, as shown in FIGS. **14-16**, in the stowing orientation the back portion **180** is oriented along or lying flat against or almost flat against the bottom portion **170**. By contrast, in one embodiment, as shown in FIG. **13**, in the deployed orientation the back portion **180** is oriented to project away from the bottom portion **170** so as to present a set of surfaces, seating surface **174** and back surface **178**, which a user may sit upon and recline against, respectively.

In some embodiments, the second actuation region **176** is operationally engaged with a selectably releasable lock **156** adapted to hold the back portion **180** in a desired orientation with respect to the bottom portion **170**. The lock **156** may be selectably releasable by a lever or other manual latch **179**. As shown in the non-limiting embodiment in FIG. **18e**, the lock **156** may be selectably releasable by a solenoid, motor, or other actuator **157** adapted to move the selectably releasable lock **156** into a desired orientation. As shown in FIG. **18e**, the lock **156** may be engaged with a proximity switch or other sensor **158** adapted to detect the state of lock **156**. It should be understood that, in other embodiments, one or more sensors **158** could be used to detect the orientation of one or more components of the stowable seat system **100**.

FIG. **13** shows one embodiment of the stowable seat system **100** in the deployed orientation. FIG. **1** shows the stowable seat system **100** with the upholstery and cushioning removed to show the infrastructure of the stowable seat system **100** in the deployed orientation. To change the shown stowable seat system **100** from the deployed orien-

tation to the stowed orientation, a user rotates the back portion **180** from the deployed orientation shown in FIGS. **13** and **1** to the stowing orientation shown in FIGS. **2, 3, 15,** and **16**; and then, once the back portion **180** is in the stowing orientation, the user rotates the seat engagement portion **140** from the substantially horizontal orientation shown in FIGS. **1** and **5** to the substantially vertical orientation shown in FIGS. **3** and **10**. The result of this operation is the stowed orientation of the stowable seat system **100** shown in FIG. **14**. Much of the floor area occupied by the stowable seat system **100** in the deployed orientation is vacated and open when the stowable seat system **100** is in the stowed orientation. This vacated area may be occupied by a wheelchair such that the stowable seat system **100** permits a seating area to be readily converted from an area adapted to accommodate a wheelchair to one having more conventional seating. In some embodiments the process of changing the stowable seat system **100** from the deployed orientation to the stowed orientation and back may be automated with the required steps being performed by actuators operationally engaged with a controller.

It should be understood that the stowable seat system **100** may be universal in the sense that it may be installed as a right-hand or left-hand seat unit, i.e., on the passenger side or on the driver side.

While principles and modes of operation have been explained and illustrated with regard to particular embodiments, it must be understood, however, that this may be practiced otherwise than as specifically explained and illustrated without departing from its spirit or scope. While the subject matter has been described with reference to certain embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted without departing from the scope of the subject matter. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the subject matter without departing from its scope. Therefore, it is intended that the subject matter not be limited to the particular embodiment disclosed, but that the subject matter will include all embodiments falling within the scope of the appended claims.

What is claimed is:

1. A stowable seat system comprising:

- a seat base comprising
 - a vehicle engagement portion adapted for operational engagement with an associated vehicle, and
 - a seat engagement portion movably engaged with the vehicle engagement portion at a first actuation region, the first actuation region comprising a first pivot defining a first axis of rotation that is substantially horizontal, the first actuation region being operationally engaged with a first selectably releasable lock; and
 - a seat frame operationally engaged with the seat base, the seat frame comprising
 - a bottom portion, and
 - a back portion movably engaged with the bottom portion at a second actuation region, the second actuation region comprising a second pivot defining a second axis of rotation, the second actuation region being operationally engaged with a second selectably releasable lock adapted to hold the back portion in a desired range of orientations with respect to the bottom portion;
- wherein the second axis of rotation is offset from the first axis of rotation;

7

wherein the offset is defined by a first vector perpendicular to both the second axis of rotation and the first axis of rotation; and

wherein a projection of the second axis of rotation into a plane normal to the first vector is perpendicular to a projection of the first axis of rotation into the plane normal to the first vector.

2. The stowable seat system of claim 1, the first selectably releasable lock being adapted to hold the seat engagement portion in a desired orientation with respect to the vehicle engagement portion.

3. The stowable seat system of claim 2, wherein the first selectably releasable lock operationally engaged with the first actuation region and the second selectably releasable lock operationally engaged with the second actuation region are selectably releasable by a manual latch.

4. The stowable seat system of claim 3, wherein the vehicle engagement portion is adapted for engagement with a floor of the associated vehicle.

5. The stowable seat system of claim 3, wherein the vehicle engagement portion is adapted for engagement with a wall of the associated vehicle.

6. The stowable seat system of claim 3, further comprising a combination of actuators and sensors adapted to switch the seat system from a deployed orientation to a stowed orientation.

7. The stowable seat system of claim 6 wherein the combination of actuators and sensors comprises

at least one actuator selected from the group consisting of a solenoid and motor, and any combination thereof; and at least one sensor selected from the group consisting of a proximity switch and a sensor adapted to detect the state of at least one selectably releasable lock.

8. A method of using a stowable seat system comprising: providing a stowable seat system comprising,

a seat base comprising

a vehicle engagement portion adapted for operational engagement with an associated vehicle, and a seat engagement portion movably engaged with the vehicle engagement portion at a first actuation region, the first actuation region comprising a first pivot defining a first axis of rotation that is substantially horizontal, the first actuation region being operationally engaged with a first selectably releasable lock, and

a seat frame operationally engaged with the seat base, the seat frame comprising

a bottom portion, and

a back portion movably engaged with the bottom portion at a second actuation region, the second actuation region comprising a second pivot defining a second axis of rotation, the second actuation region being operationally engaged with a second selectably releasable lock adapted to hold the back portion in a desired range of orientations with respect to the bottom portion;

wherein the second axis of rotation is offset from the first axis of rotation;

wherein the offset is defined by a first vector perpendicular to both the second axis of rotation and the first axis of rotation; and

wherein a projection of the second axis of rotation into a plane normal to the first vector is perpendicular to a projection of the first axis of rotation into the plane normal to the first vector;

8

rotating the back portion from a deployed orientation projecting away from the bottom portion to a stowing orientation lying flat against the bottom portion; and rotating the seat engagement portion from a horizontal orientation to a vertical orientation.

9. The method of using a stowable seat system of claim 8, the first selectably releasable lock being adapted to hold the seat engagement portion in a desired orientation with respect to the vehicle engagement portion.

10. The method of using a stowable seat system of claim 9, wherein the first selectably releasable lock operationally engaged with the first actuation region and the second selectably releasable lock operationally engaged with the second actuation region are selectably releasable by a manual latch.

11. The method of using a stowable seat system of claim 10, wherein the vehicle engagement portion is adapted for engagement with a floor of the associated vehicle.

12. The method of using a stowable seat system of claim 11, wherein the vehicle engagement portion is adapted for engagement with a wall of the associated vehicle.

13. The method of using a stowable seat system of claim 10, further comprising a combination of actuators and sensors adapted to switch the seat system from a deployed orientation to a stowed orientation.

14. The method of using a stowable seat system of claim 13 wherein the combination of actuators and sensors comprises

at least one actuator selected from the group consisting of a solenoid and motor, and any combination thereof; and at least one sensor selected from the group consisting of a proximity switch and a sensor adapted to detect the state of at least one selectably releasable lock.

15. A stowable seat system comprises:

a seat base comprising

a vehicle engagement portion adapted for operational engagement with the floor of an associated vehicle, and

a seat engagement portion movably engaged with the vehicle engagement portion at a first actuation region,

the first actuation region comprising a pivot defining a first axis of rotation that is substantially horizontal, and

wherein the first actuation region is operationally engaged with a selectably releasable first lock adapted to hold the seat engagement portion in a desired orientation with respect to the vehicle engagement portion, the first lock being selectably releasable by a manual latch;

a seat frame operationally engaged with the seat base, the seat frame comprising a bottom portion, and

a back portion movably engaged with the bottom portion at a second actuation region, the second actuation region comprising a pivot defining a second axis of rotation;

wherein the second axis of rotation is offset from the first axis of rotation;

wherein the offset is defined by a first vector perpendicular to both the second axis of rotation and the first axis of rotation;

wherein a projection of the second axis of rotation into a plane normal to the first vector is perpendicular to a projection of the first axis of rotation into the plane normal to the first vector;

wherein the second actuation region is operationally engaged with a selectably releasable second lock

adapted to hold the back portion in a desired orientation with respect to the bottom portion, the second lock being selectably releasable by a manual latch; and

further comprising a combination of actuators and 5 sensors adapted to switch the seat system from a deployed orientation to a stowed orientation.

16. The stowable seat system of claim **15** wherein the combination of actuators and sensors comprises

at least one actuator selected from the group consisting of 10 a solenoid and motor, and any combination thereof; and at least one sensor selected from the group consisting of a proximity switch and a sensor adapted to detect the state of at least one selectably releasable lock.

* * * * *